ADDRESSES AND ORIGINAL ARTICLES

RINCIPLES OF X RAY THERAPY OF MALIGNANT DISEASES *

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(WITH ILLUSTRATIVE PLATES)

HE discussion of the principles of X ray therapy ıalignant tumours will be divided into four parts :

;) Some results of sufficiently long standing to r that the cure of cancer by X ray therapy is ıible.

) The physical and clinical technique by means hich these results have been obtained.

) General biological principles.

) Present knowledge of X ray therapy of cancer.

Results of X Ray Therapy of Cancer

is certain that some cancers can be cured by ays, but the proportion of cures is at present er small and local and general accidents, early te, are not infrequent.

Tables I., II., and III. we reproduce the ts obtained by X ray treatment in some cases ally studied at the Fondation Curie.

Table I

phosarcoma of the mouth, tongue, and nasopharynx

s treated m 1920) 1926.	Survivals	
	after 5 years.	after 7 years.
45	8 (17%)	8 (17%)

lymphosarcoma, lymphatic metastases are generally ent, especially during the first years. The cured remained in good health, without metastases, for between 5 and 7 years.

Table II

Epithelioma of the tonsillar region

treated n 1920 1926.	Survivals	
	after 5 years.	after 7 years.
46	13 (28%)	8 (17%)

he 13 patients still alive five years after their treat- 5 died between the fifth and seventh year, 4 of them bdominal or thoracic metastases.

Table III

Epithelioma of the larynx

treated n 1920 1926.	Survivals	
	after 5 years.	After 7 years.
77	22 (28%)	21 (27%)

22 patients who survived five years, only one died en the fifth and seventh year from a local recurrence.

have to keep in mind that the proportion of is not so high every year ; in some years the er increases, in others it drops. For instance, pitheliomas of the tonsil and soft palate the 1925 was a bad one. Out of 13 patients treated, one patient is alive five years afterwards—i.e., r cent. For epithelioma of the larynx the 1922 was a bad one. Of 11 patients treated, not as alive after three years ; in the previous year however (1921) out of eight patients treated, four were still living when inquiry was made at the end of 1933—i.e., about 12 years after treatment.

In the larynx, more than in any other site, some cancers are easy and some very difficult to treat. X ray therapy of cancer of the larynx is relatively easy when the growth has only slightly immobilised the muscle and not yet invaded the cartilage. In these cases there are few failures and few accidents. The cutaneous dose necessary for the healing of these cancers is small, on an average 6000 r (on the skin), with fields of 50 sq. cm. and a duration of 15–25 days.

X ray treatment of radioresistant *cancers of the larynx*, which have immobilised the hemi-larynx, infiltrated the muscle, and invaded the cartilage, is generally difficult. In spite of heavy doses these cases are not often cured and accidents may occur. Doses of 7000 to 8000 r or more are required and often constitute the maximum supported by the tissues. This is a great difficulty which may be made less serious by a better distribution of the energy in the time. Nevertheless, X ray therapy being still in its infancy, it must, in radioresistant cancers, frequently yield to surgery or be combined with surgery ; for we must not forget that, in laryngeal cancers for instance, while X rays may be applied without danger to a recurrence following surgical operation, surgical intervention after X ray application is often dangerous.

The treatment of *cancer of the uterus* has given, at the Fondation Curie, results generally superior to those mentioned above, but X rays have rarely been applied alone. There has been nearly always an association of X rays and radium.

Cancer of the breast appears to be influenced most favourably by X rays, but our results do not cover a sufficiently long period to be reproduced here. The time needed for collecting control statistics of cancer of the breast is necessarily very long, since many cases are of slow evolution.

TWO ILLUSTRATIVE CASES

In order to give some idea of the appearance and extent of the lesions of the larynx and pharynx which X ray therapy is capable of causing to disappear, we reproduce radiograms, taken before and after treatment, of two extensive and certainly inoperable cancers.

The first case is that of an epithelioma of the larynx.

Fig. I., with explanatory diagram, shows a lesion which has invaded the whole of the larynx, from the hyoid bone to the inferior border of the cricoid. The transparent laryngeal space has disappeared at the level of the thyroid cartilage, the cricoid and the crico-thyroid space. The thyroid cartilage is partly destroyed. The pre-epiglottic space is invaded so that the thyroid portion of the epiglottis is forced backwards. The cricoid is pushed forwards, indicating an invasion of the pharynx through the spread of the neoplasm beyond the larynx. Clinically there was complete immobility of both halves of the larynx and a tracheotomy had to be performed.

Fig. II., taken one month later, shows considerable reduction of the lesion : the epiglottis has returned to its normal position. The laryngeal transparency is beginning to reappear and the transparent area of the ventricle of Morgagni is particularly noticeable.

Fig. III., with explanatory drawing, shows, a year later, the return of the larynx to its normal state. It has been possible to remove the tracheotomy tube ; the transparent laryngeal space is normal, and the epiglottis, thyroid, and cricoid cartilages have regained their usual appearance. The patient is at present in good health.

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* livered at the Rooms of the Medical Society of London . 15th, 1934, on the occasion of the opening ceremony X ray department of the Marie Curie Hospital.

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The second case is that of an epithelioma of the hypopharynx.

Fig. IV. shows a lesion of the hypopharynx, extending from the entrance of the œsophagus below, that is to say, the inferior border of the cricoid, up to 2 cm. above the angle of the mandible, an estimated length of 7 to 8 cm. The hyoid bone, the cricoid cartilage, and the thyroid are pushed forward from the vertebral bodies by the neoplastic mass.

Fig. V. shows the return to the normal state one year and three months later. The tumour has disappeared; the hyoid bone, the thyroid, and the cricoid are again in contact with the vertebral bodies. This patient, after remaining cured locally, died six years later from pulmonary metastases.

Physical and Clinical Technique

Factors to be considered include tension, filtration, focal distances, fields, and dosage.

The results recorded above have been obtained under the following conditions:—

With a maximum tension of 190 to 200 kilovolts we have used 2 mm. of zinc and 3 mm. of aluminium, covered by 3 cm. of wood. The focal distances have been 50 to 60 cm. for lesions of the head and neck. For deeply situated lesions, such as cancer of the uterus, the focal distances have been 80 to 100 cm.

The quantity of energy, or dose delivered, has been measured on the skin and calculated in international r units.

The number of fields or ports of entry, their shape and size, have, of course, varied according to the extent of the lesion, its depth, and the glandular spread. In general, in dangerous zones—i.e., the head and neck—the area of the fields has been from 50 to 100 square cm., with alternating cutaneous doses which have been able to reach as a maximum in some cases 700 and even 800 r per day, during one, two, or three days; sometimes a dosage of only 200 to 300 r per day has been used, or even less. In tolerant zones, such as the subumbilical abdomen, the area of the fields has been on an average 250 to 300 square cm., with alternating cutaneous doses not exceeding 500 r per day.

Among the epithelial cancers which we have treated, those which have definitely disappeared have had depth doses ranging from 3000 to 4000 r for the radiosensitive, non-infiltrating forms and doses a little higher for the radioresistant forms. These figures correspond approximately to the doses received by the most deeply situated parts of the neoplastic lesion.

TECHNIQUE

The technical part of the treatment has thus consisted in delivering to the deepest parts of the neoplastic lesion the quantity of energy considered expedient. The total cutaneous dose has necessarily had to be much higher than the cancericidal dose or depth dose when the distance from cancer to skin was great and when the fields were small. The total cutaneous dose may be relatively little different from the depth dose if the fields are large and the distance from cancer to skin is small. Thus it happened that the total cutaneous doses in the cases of cancer of the larynx in thin subjects were only 50 per cent. greater than the dose which would produce disappearance of the cancer, while in cancer of the uterus they were in certain cases, in spite of the use of large fields, four times greater than the cancericidal depth dose; the utilisation of six to eight fields or more was thus unavoidable. The use of numerous fields has given rise to research in Germany on the depth dose as compared with the surface doses; these researches have been carried out with remarkable precision by means of calculation and the phantom.

Most of the sites which we have systematically treated have been chosen from among those whic it was possible to observe clinically each day. W have always preferred to rely on a daily examinatio of the patient rather than in a knowledge of th depth dose. This examination involves daily verification of changes in the appearance of the neoplasm, o the vasculo-connective tissue and of the mucous membranes adjoining the neoplasm; observation of th glandular secretions; and a note of the genera reaction of the organism. Indeed, as we shall see late on, while the dose is an element of the X ray therap of cancer (though an element very difficult to determine in advance), the biological conditions unde which this dose must be distributed are sometimes mor important, the exception being in the case of the ver small, superficial, and very radiosensitive cancers.

VASCULO-CONNECTIVE TISSUE AND GLANDULAR RADIOREACTIONS

The most prominent and most evident vasculo-connective tissue radioreactions are the early œdema, the erythema of the skin, and the local congestion of the mucous membranes. Sometimes they develop in a progressive manner and in this case they may not be too harmful. Sometimes they appear abruptly in the course of treatment when the dose or the intensity has been increased too much; in this case they are as incompatible with the involution of the cancer as with the conservation of the medium in which the cancer is growing.

The œdema, erythema, and local mucosal congestion are most often preceded by slight modifications of the vasculo-connective tissue, sometimes hardly appreciable locally. These slight modifications bring about local and general subjective disorders, such as the sensation of local uneasiness, swelling, pain, general malaise, and in the more marked cases, the appearance of nausea, asthenia, cardiac disturbance, and rise of temperature. Sometimes there is an enormous disproportion between the small doses given and the severity of the effects produced in the local tissues and on the general condition. The general effect of these symptoms necessitates the moderation of treatment, because apparently trifling lesions of the vasculo-connective tissue, and symptoms hardly appreciable during the course of the treatment, are sometimes, after three to four weeks, followed by marked modifications of the normal tissue, which modifications increase considerably after some years.

The changes in the glandular secretions manifest themselves by subjective and objective phenomena. In particular, when the salivary secretion, for example, becomes too abundant, glandular modifications are already appreciable. One must not wait, before reducing the treatment, until the secretions of the glands of the buccal cavity are thick, viscous, and adherent, until the perversion of taste is absolute and until these disturbances hinder the nutrition of the patient.

THE THREE PRINCIPAL TYPES OF EPITHELIAL RADIOREACTION

Since epithelial radioreactions have been our principal guides during X ray therapy of cancer, it is necessary to learn to recognise them. They are easier to observe than the radioreactions of the vasculo-connective tissue.

The first epithelial radioreaction to be recognised was the cutaneous "radio-epidermitis" described by Regaud and Nogier in 1913. In 1922 I described the "radio-epithelitis" of the mucous membranes of the pharynx and buccal cavity. These two radioreactions occur in the covering pavement epithelial cells. There exists a third reaction, the radio-epithelitis of the columnar epithelial cells.

The three epithelial radioreactions consist essentially in the destruction of the epithelial cells covering the site of the irradiated surfaces. On the mucous membranes they manifest themselves by the disappearance of the epithelial layers, the denudation of the chorion which becomes covered by fibrin and false membranes. The false membranes are sometimes blood-stained, thick, or greyish when the treatment has been too intense or when there is superadded infection. The false membranes ought to be thin and clear if the dose has not considerably overstepped the threshold of reaction. In this case the radio-epithelitis is almost painless; it does not become infected and it is rapidly repaired, leaving no trace. Cutaneous radio-epidermitis presents the same characters, loss of epithelial layers and denudation of the dermis. There should be no tendency to hæmorrhage, there is no objection to the production of a slight exudation, and in this case repair will not be delayed.

When daily doses of approximately 350 to 400 r, in two séances, are given to the skin of the cervical region,[1] the three epithelial radioreactions manifest themselves at fixed periods in relation to the commencement of irradiation. They can be particularly well studied in this region where the different types of mucous membrane are very close one to the other.

The aryteno-epiglottic folds constitute a lateral wall separation between the larynx and pharynx. On the est of this wall there exists a mucous membrane covered very fragile stratified epithelium. In this zone, dio-epithelitis of the stratified cells generally appears wards the 13th or 14th day *after the beginning of* adiation; this is the earliest of the epithelial radio-actions of this region. Lower down, in the larynx, the level of the vocal cords, where the stratified ithelium resembles that of the skin, radio-epithelitis pears, towards the 27th or the 28th day, at the same me as the cutaneous radio-epidermitis. At the level the ventricular bands and below the glottis, on the ucosa covering *the tracheal* rings, the epithelium is lindrical or columnar. Radio-epithelitis of the cylindrical-lled mucosa appears third, towards the 39th or 40th day.

If irradiation is more intense, the radioreactions appear lier, respectively on the 10th and the 24th day, for the o first; sometimes the third reaction appears a very r days after the second. It seems that in the course of an ense treatment, the different varieties of cells lose the perty of disintegrating and disappearing at the times, ed, constant and characteristic of each type; they serve the property only when the irradiation has been mal.

f irradiation is less intense, the radioreactions are arded; they appear towards the 18th, 34th, and 48th s respectively. Under a certain threshold, that is, h less than a certain daily dose, they do not appear ll.

IE DURATION OF EPITHELIAL RADIOREACTIONS

ie repair of each of the three epithelial radio-ions ought to be at its maximum in two weeks its onset, the radio-epithelitis of the stratified-l mucosa ought to be repaired by the twenty-sixth at the time of the appearance of the cutaneous epidermitis. The cutaneous radio-epidermitis, ie radio-epithelitis of the stratified-celled mucosa bling the cutaneous type, ought to be repaired thirty-ninth day, at the time of the appearance of the radio-epithelitis of the cylindrical epithelium. Radio-epithelitis of the cylindrical cells ought to be repaired towards the fifty-fifth day. Altogether the three principal epithelial radiolesions are thus spread over six weeks, that is to say, they appear at the beginning of the third and disappear at the beginning of the ninth week. This at least is what happens if the irradiation has been given in the time and under the conditions indicated above, with a maximum field of 50 square cm.

One ought to endeavour to obtain epithelial radioreactions of 10 to 12 days' duration when treating cancers so extensive that fields larger than 50 square cm. are necessary. For a very extensive cancer, necessitating a field in the order of 100 to 125 square cm., the duration of repair of the radioreactions ought not to exceed eight days.

Above 150 square cm. and particularly for the large abdominal fields of 3 to 400 square cm., loss of the entire epithelial layers ought to be avoided on the skin as well as on the mucosa of the vagina, intestines, or bladder, and one ought to provoke neither cystitis, proctitis, nor enteritis. The epithelial desquamation ought to be effected without laying bare the dermis or chorion, that is to say, the superficial layers only ought to disappear. Cutaneous radio-epidermitis of the abdomen ought to be non-exudative.

THE APPEARANCE OF THE EPITHELIAL RADIOREACTIONS

The two examples of radio-epithelitis, illustrated in Figs. VI. to XV., show that repair of the radio-epithelitis is effected either by central islands of epithelial cells, whose number increases rapidly at first, so that the islands enlarge quickly and become confluent; or by semicircular epithelial surfaces arising from the periphery and directed towards the centre; or by these two means in association. These are the normal methods of repair, indicating that the vasculo-connective tissue has been relatively preserved. If there is greater change, repair is no longer effected by the islands of cells; it is done by linear cellular formations, as can be observed in the central portion of the radiolesions we have chosen for an example. In this region the borders of the lesion are rectilinear and are covered slowly and with difficulty with epithelial formation.

The first example of prolonged cutaneous radio-epidermitis is that of a patient suffering from epithelioma of the left lateral pharyngeal wall, with pronounced adenopathy on the left side.

Treatment was completed in 22 days. The dose was 7000 r in 22 hours, on the side of the lesion, with two *fields of* about *80* square cm., one antero-posterior, the other transverse; the two fields overlapped on their borders.

Radio-epidermitis appeared on the 28th day. Repair was very slow, since on the 11th day (Fig. VI.) the radio-lesion was still very extensive; it was repaired chiefly from the periphery where the semicircular cellular surfaces are to be seen; very few central islands of epithelial cells exist. Between the 11th and the 16th day, *that is*, within five days (Fig. VII.), repair was appreciable, but it was only peripheral. After 34 days (Fig. VIII.) a cutaneous linear lesion remained. At this stage epithelial elements are no longer formed; the epithelial cells appear to be incapable of developing in the modified connective tissue.

Complete repair was only effected on the 43rd day (Fig. IX.), with a visible central scar, accompanied by late œdema. In this case the dose has been distributed in too short a time.

The second example of excessive cutaneous radio-epidermitis is that of a patient irradiated from Nov. 3rd to the 28th, 1931, on the sternoclavicular area, through a single field of 190 square cm.

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[1] man of average musculature it is advisable not to a period of 13 days a dose of 5000 r, of which 4000 r he same side of the neck, with a maximum field of 50 These are [illegible] we are using less and less [illegible] tolerated them and cure of [illegible] 6000 r in 15 to 16 days, umber of patients cannot stand such doses.

6200 r were given in 27 hours, during 26 days, at the rate of two séances a day. Radio-epidermitis appeared late, on Dec. 11th, 1931, that is, on the 39th day (Fig. X.). Three days later, on Dec. 14th (Fig. XI.), repair was already appreciable; it was both peripheral and central. Central islands of epithelial cells were numerous and two days later, on Dec. 16th (Fig. XII.), the radio-epidermitis was reduced by half. From Dec. 16th to 18th the rate of multiplication of the islands was still rapid (Fig. XIII.). From Dec. 14th to 24th (Fig. XIV.), that is to say, in 10 days, the diminution of the surface deprived of epithelium was normal and it seemed clear that final repair would follow. But the lesion then diminished slowly, the radio-epidermitis became linear in the centre, and the connective tissue appeared no longer able to provide for the nutrition of the epithelial cells. Repair was only complete on Jan. 10th, 1932, on the 30th day.

In this case the connective tissue has been too much modified by the rays, as is shown by the appearance of the skin two years later, on Oct. 12th, 1933 (Fig. XV.). Here is shown a permanent alteration in the skin with dyschromia and sclerosis. It would have been better to reduce the dose to 5000 r, considering the large dimensions of the field, or else substantially to prolong the duration of the treatment.

This excessive duration of radio-epidermitis and also of radio-epithelitis is caused by an exaggerated modification of the vasculo-connective tissue. In these conditions the nutrition of the epithelial cells is imperfect; these cells at first multiply rapidly, then more and more slowly because there is more and more difficulty in finding the substances necessary for their metabolism. It becomes an effort to cover over the whole surface of the dermis or the bare chorion. No wound is repaired so slowly as is a radio-epidermitis if the vasculo-connective tissue has been damaged by irradiations; and on the other hand no wound is repaired so quickly if the vasculo-connective tissue has been preserved, while the naked-eye appearance of the two lesions differs very little.

General Biological Principles

THE EFFECT OF VASCULO-CONNECTIVE TISSUE RADIO-REACTIONS ON RADIOSENSITIVITY OF CANCER CELLS

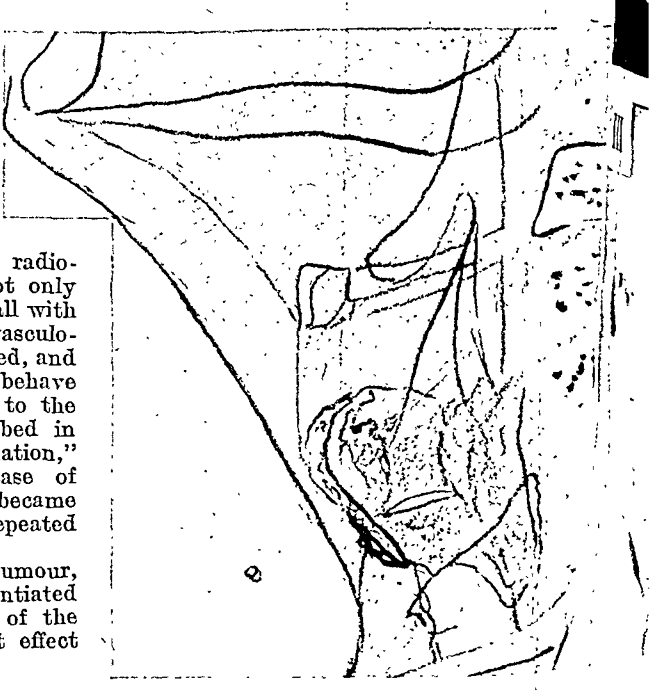
Like the nutrition of the normal epithelial cells in the course of the repair of a radio-epidermitis, the nutrition of the cells of an epithelioma during irradiation is dependent upon the conservation of the medium, in which it lies, that is, of the vasculo-connective tissue.

If the total dose, or the daily dose, or the intensity per minute has been too high, if the field has been too large in relation to the doses, or if the filtration or the tension has been too low, the connective tissue may be modified. The nutrition of the epithelioma cells thus becomes difficult. The cellular radiosensitivity, which seems to be linked up not only with the youthfulness of the cells but above all with the activity of their interchanges with the vasculo-connective tissue, is modified, often diminished, and sometimes suppressed. The cancer cells behave clinically as if they had become insensitive to the irradiations. This is what Regaud described in 1913, under the name of "radiovaccination," after an extremely careful study of a case of spindle-celled sarcoma of the scalp which became radioresistant in the course of intense and repeated treatments.

In the case of a very embryonic tumour, such as lymphosarcoma, or an undifferentiated epidermic epithelioma, the radiomodifications of the vasculo-connective tissue have a very slight effect

upon the radiosensitivity of the cancer cells be
this sensitivity is pronounced. In a highly diffe
ated tumour, either an epidermoid epithelioma
prickle cells predominating, which is infiltratin
muscle, or a tubular adenocarcinoma, the
modifications of the vasculo-connective tissue
the utmost importance because the radiosensi
of these tumours is feeble.

In the first case, the effect of X rays on
cancer cells is always rapid, sometimes imme
According to their type, the cells of tumou
embryonic type die in the course of the fir
weeks, more rarely from the fifteenth to the tw
fifth day after the start of irradiation. Most
the modifications of the vasculo-connective tiss



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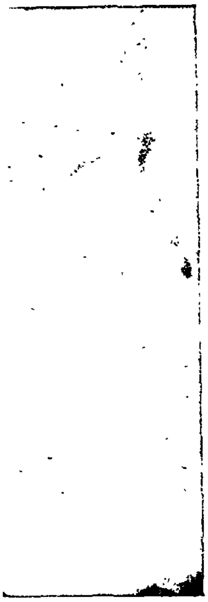
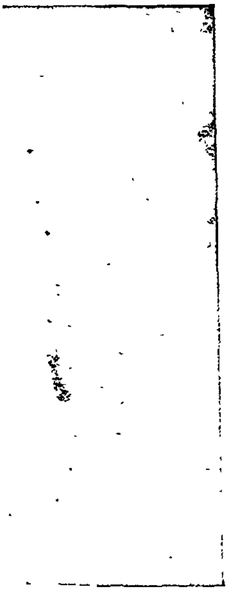
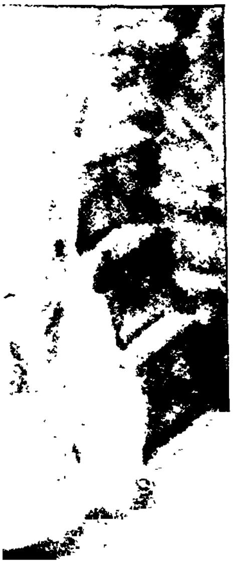
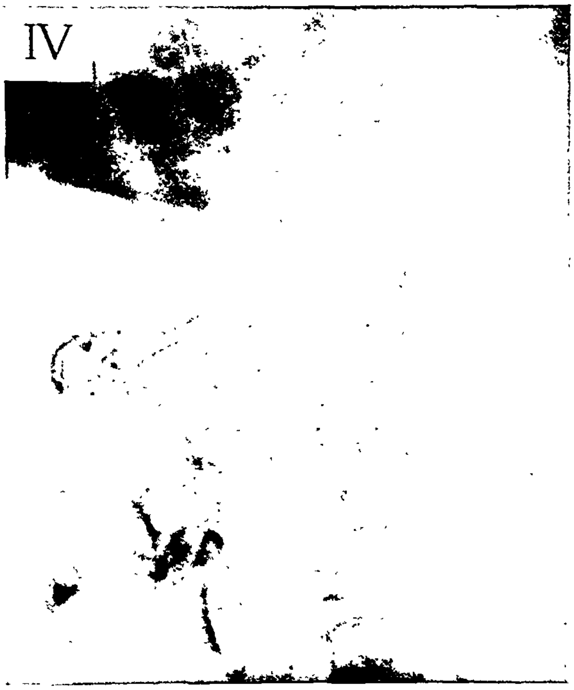








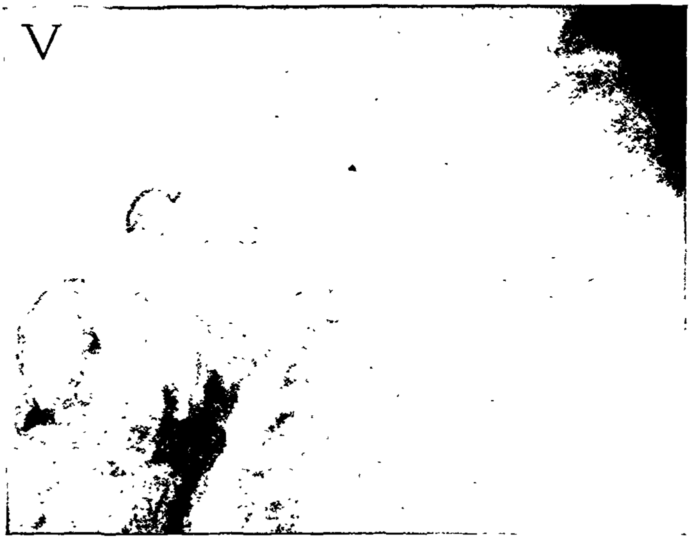


FIG. I

Epithelioma invading the whole larynx, and necessitating tracheotomy. Anteriorly, the pre-epiglottic region is invaded; posteriorly, the neoplasm extends beyond the arytenoid fold and reaches the posterior part of the cricoid.

FIG. II

Regression of the lesion a month after the beginning of X ray therapy. The laryngeal transparent space has reappeared.

FIG. III

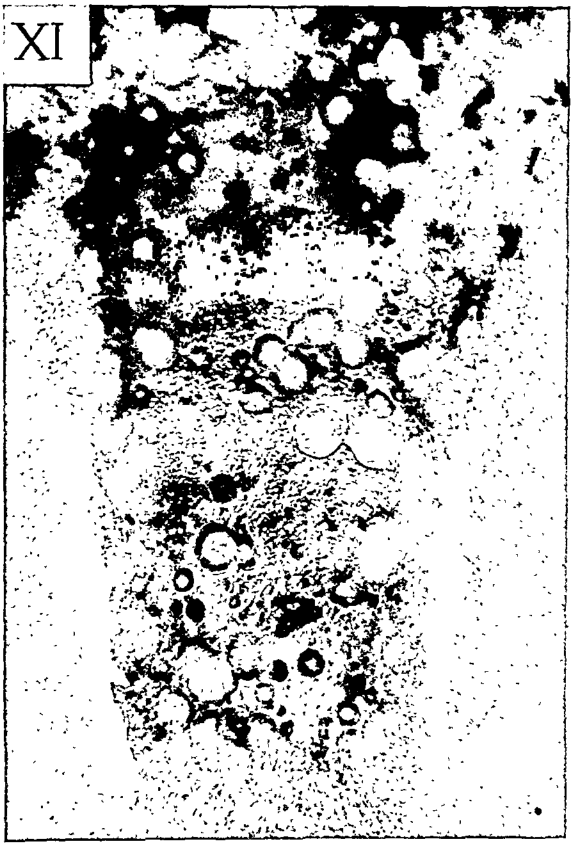
Return to normal, the tracheotomy tube having been removed. A year and a half after treatment the patient is apparently cured locally.

FIG. IV

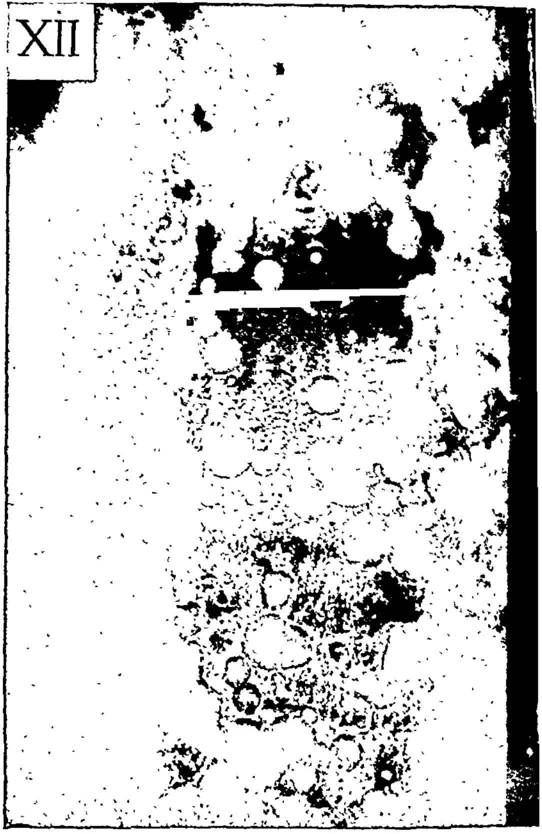
Epithelioma of the hypopharynx, extending from the mouth of the œsophagus up to 2 cm. above the angle of the mandible. The laryngeal cartilages are pushed forward, away from the vertebral bodies.

FIG. V

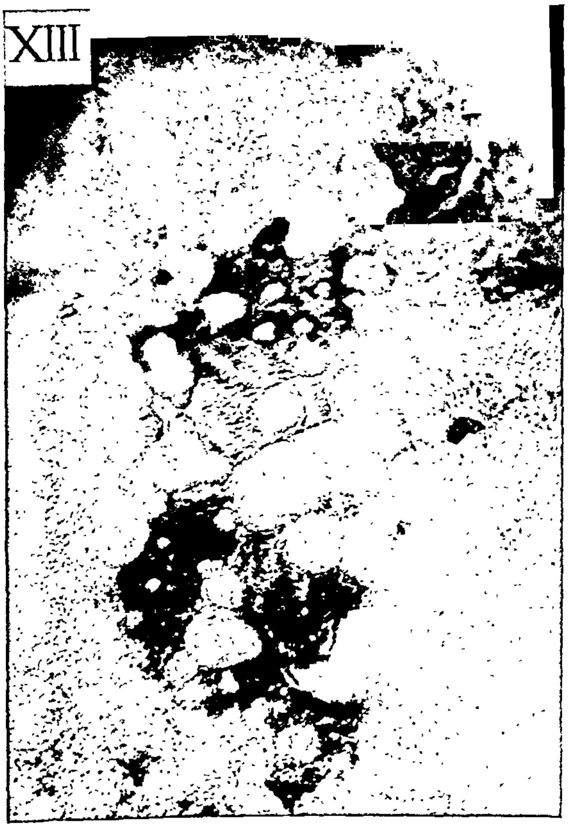
Disappearance of the tumour shown in Fig. IV.: the relation of the larynx to the vertebral bodies is now normal, and the hyoid bone and the thyroid are in contact with the vertebral bodies.


XI

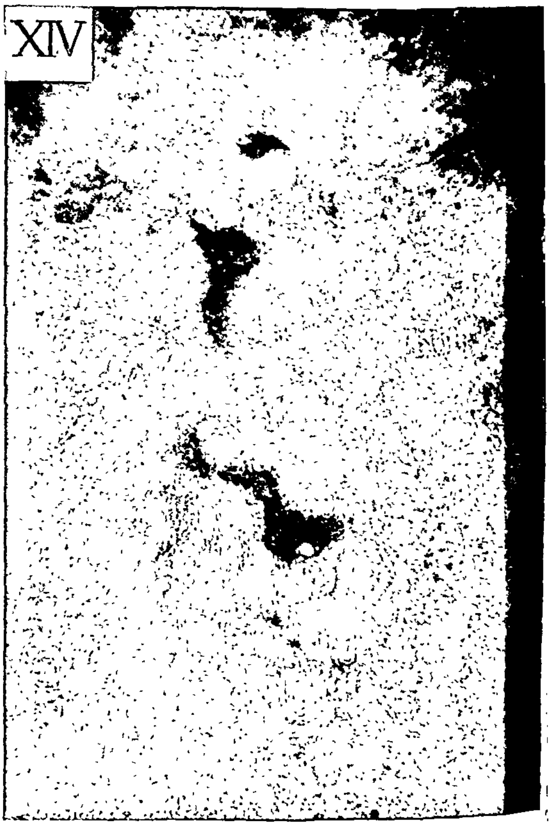
Third day after the onset of radio-epidermitis in case shown in Fig. X. Repair begun by means of peripheral epithelial islands and some central islands.


XII

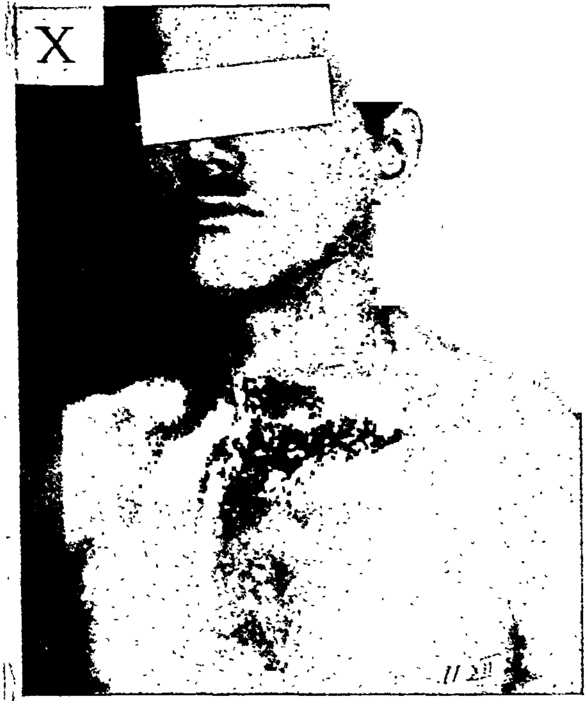
Fifth day. The size of the radio-epidermitis has decrease by half.


XIII

Seventh day. The radio-epidermitis seems to be diminishing very rapidly.


XIV

Seventeenth day. Repair is still rapid but tends to be no longer effected by epithelial islands but by rectilinear groups of epithelial cells.



Appearance of a radio-epidermitis on the 39th day after the beginning of treatment.

not sufficiently early nor sufficiently great to reduce the radiosensitivity of the embryonic cancer cells in any appreciable manner.

In the second case, the effect of X rays on the differentiated cancer cells is not immediate. It appears slowly, little by little, in the course of a very long time, the exception being for the cells which were in mitosis from the beginning of treatment. If the vasculo-connective tissue remains perfectly normal, the less differentiated cells disappear from the forty-fifth day after the beginning of treatment; the more differentiated towards the ninetieth and sometimes the hundredth day. If the vasculo-connective tissue is modified by the irradiations, experience shows that disappearance of differentiated cells does not occur.

THE DAILY QUANTITIES OF ENERGY AND THE RADIO-RESISTANCE OF THE CANCER CELLS

Up to 1926 we thought that the essential cause of loss of radiosensitivity of the cancer cells, in the course of treatment, was the length of each treatment and we set ourselves to give treatments of short duration.

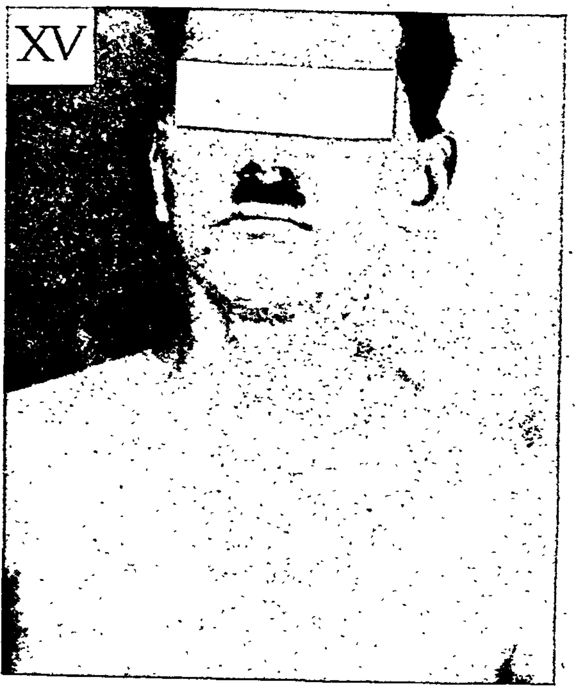
In fact we had observed that cures of certain cancers were obtained only when the duration of treatment had not exceeded 15 to 16 days. After this time the cells seemed to be no longer altered by the irradiations and the general condition of the patient was made worse. In these cases, during the first week of treatment, the skin dose had been very high, 4000 to 4500 r; the remainder, about 2000 r, had been given during the following week, with weaker daily doses. Thus, a dose of 4500 r in six days necessitated giving 750 r per day, that is to say, a considerable daily quantity of energy, with high minute intensity.

Later, we were able to observe that if we gave this same initial dose of 4500 r in 10 to 12 days, instead of six days, it was possible to obtain cure with a longer treatment than in the preceding cases, on condition that the total duration of treatment did not exceed 20 to 21 days. After 20 to 21 days of irradiation the cancer seemed to become insensitive; a treatment of longer duration was generally inefficacious. In these cases the daily dose for the first 10 days was about 450 r. Subsequently, the duration of treatment was progressively increased up to 30 days, then up to 40 days; in this last case, it was possible to obtain cure when the daily dose during the first 10 days did not exceed 300 r. Little by little, also, in the course of years, it became evident that the chronology limit of treatment, beyond which the cancer seemed to become insensitive, was not fixed.

Observation of clinical facts shows us that changes in the vasculo-connective tissue result much more from excessive daily doses and excessive intensity per minute than from the excess of the total dose. Thus, for the same total dose, the daily doses are necessarily increased with diminution of the duration of the treatment. Consequently, the shorter the duration of the treatment and the higher the daily doses, the quicker appear the changes in the supporting tissue, that is, the vasculo-connective tissue, and the quicker is manifested the reduction of radiosensitivity of the cancer. Conversely, radiosensitivity was the longer preserved when the daily doses were weaker, that is to say, when the duration of treatment was longer, always provided that the daily doses were not less than the threshold dose necessary for the disappearance of the neoplastic cells.

THE TOTAL QUANTITY OF ENERGY OR DOSE AND THE CURE OF UNDIFFERENTIATED OR NOT VERY HIGHLY DIFFERENTIATED CANCERS

During the years 1920 to 1926 the duration of treatment for the cured epitheliomas was on an average from 15 to 21 days for the larynx, from 25



Same case as shown in Figs. X. to XIV. two years after beginning of treatment; permanent modification of the skin. Dyschromia and sclerosis. The too intense radio-epidermitis (duration 30 days) has taken too long to be repaired. With a field of this size repair ought to be effected in 8 to 10 days.

to 31 days for the hypopharynx, and from 30 to 40 days for the tonsillar region. For lymphosarcomas it was from 13 to 30 days. The total doses for the cured epitheliomas was from 6000 to 8000 r, measured on the skin; the daily doses during the first week were of 350 r for cancers treated in 25 to 30 days, and from 600 to 700 r for cancers treated in a short time. The intensity per minute varied between 3 r and 5 r.

Under these conditions of treatment we necessarily produced considerable modifications of the vasculo-connective tissue; this is why we were only able to cure those epitheliomas in which the changes in this tissue were of little importance, that is to say, the undifferentiated or slightly differentiated epitheliomas. Cure of differentiated cancers or of cancers infiltrating the muscles was exceptional.

We next thought it possible to obtain cure in differentiated cancers by increasing the dose. These efforts were fruitless. Under the same conditions of treatment, *increasing the dose above 10,000 r up to 12,000 r, and even 15,000 r, never gave us a single case of cure* but always aggravated the general condition of the patient; modifications of the vasculo-connective tissue were more and more marked and demonstrated more and more clearly the loss of sensitivity, besides radio-accidents of all kinds.

THE SYSTEMATIC LENGTHENING OF THE CHRONOLOGY OF TREATMENT AND THE CURE OF DIFFERENTIATED EPITHELIOMAS

Since we became convinced that radioresistance of cancers is the result of excessive daily doses and too high intensity per minute, acting through *modification of the vasculo-connective tissue,* and was not due to treatment having been spread over too long a time as we had formerly believed, we were naturally led to prolong the duration of treatment for cancers which seemed to us to derive benefit from this prolongation.

It was for this reason that from 1927 to 1933 we have, with our collaborator F. Baclesse, extended the duration of treatment for certain cancers, *little by little,* from 30 to 90 days, by means of *weak daily doses* (in the order of 175, 200, 225, or 250 r per day), distributed in two séances, without varying the other factors and particularly the size of the fields. We were able thus to obtain disappearance of cancers which up to then we had considered radioresistant and which we had never cured, such as very differentiated epidermoid epitheliomas, invading the muscles and cartilages, glandular epitheliomas of the breast and of the thyroid body, and special round-celled epitheliomas of the upper part of the ethmoid and adjacent sinuses.

In glandular cancers of the breast we had only, up to then, using heavy doses given in under 30 days, obtained amelioration, exceptionally definite disappearance, or even local disappearance followed by the development of lesions in neighbouring glands or distant metastases. We believe that, for these very differentiated tumours, rapid and intense X ray therapy, given in less than 30 days, is often one of the causes of the development of metastases. On the contrary, the treatment of very differentiated epitheliomas *by small doses,* capable of preserving the vasculo-connective tissue, that is to say, by small daily doses repeated over a period of 45, 50, and even 70 days, seems to us actually more favourable and gives us better results not only locally, but in a slower development of glands, and in a lessened frequency of metastases.

Present Knowledge of X Ray Therapy of Cancer

THE TIME FACTOR

Alongside the energy factor, considered *originally* as the sole factor or at least essential to the X ray therapy of cancer, the daily repetition of irradiation in doses either uniform or unequal and the increase in the number of days of treatment, have provoked a second factor, the time factor. This time factor has long consisted in a chronological distribution of the irradiations so that the general and local accidents *observed previously might* be avoided, thanks to an increase in the difference of sensitivity between the neoplastic tissues and the normal tissues. The chronology was, above all, protective, at least in principle, for actually it did not always succeed in protecting the normal tissues against post-X ray complications. Complications and accidents in X ray therapy of cancer, when the treatment is identical, appear or do not appear according to *variations in individual susceptibility. The vasculo-connective tissues are shown to be very fragile or very resistant in individual patients.*

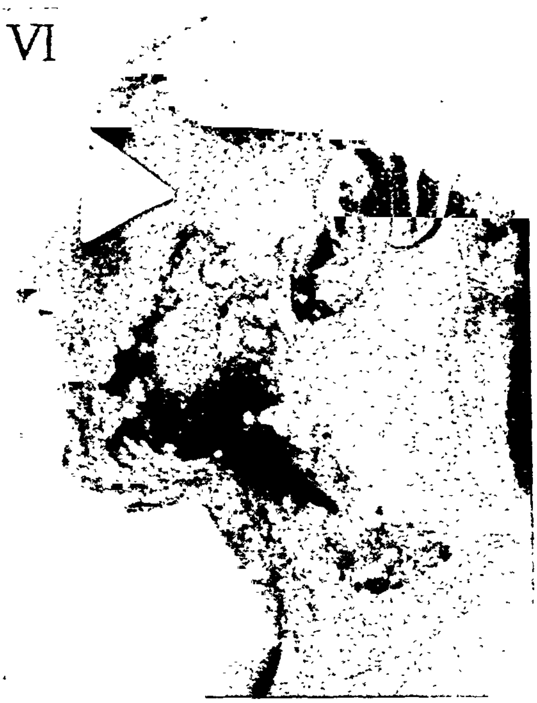
As regards the embryonic cancers, where it is sometimes possible to give treatment in short periods of from 18 to 20 days, a good chronological distribution can ensure protection to the surrounding tissues. As regards the differentiated cancers which we now treat over a long period, notably 45, 50, 60 days or more, the chronology has a different character. On the one hand, accidents to the general tissues are exceptional on account of the long time over which treatment is spread. On the other hand, disappearance of the cancer cells does not happen by cellular destruction between the eighth and twenty-fifth day, as in embryonic cancers, but by a sort of late cellular evolution, similar to the normal evolution. Between the forty-fifth and the ninetieth day we see the neoplastic masses, which have generally diminished in volume during the previous irradiations, increase anew for eight to ten days, giving the impression of a *rapidly growing* recurrence, then cover themselves *with horny formations or glandular secretions* and diminish anew in size and little by little disappear. For this slow evolutionary effect to be produced it seems necessary for the treatment to be carried out over a very long period, by means of very small daily doses. The chronology is no longer protective; it seems to be evolutionary.

CANCERS OF VERY EMBRYONIC TYPE

In the treatment of very embryonic, very radio-sensitive cancers, the energy factor is predominant. The action of X rays seems to be a direct one; it is rapid; the cells die very soon and have generally disappeared towards the twenty-fifth day. The medium, the vasculo-connective tissue, only plays a very small part. Whereas it is sometimes modified by the irradiation, it is more often modified after the destruction of the cancer cells. *It is possible,* moreover, to find no modification whatever of these tissues. Sometimes the covering tissues reveal not a single trace of the irradiations, as if the dose delivered had corresponded exactly to the quantity of energy necessary for the destruction of the cancer cells and as if the energy was entirely utilised by these cells.

The time factor, as I have said above, enables us mainly to achieve the *preservation* of the general tissues and to avoid early or late accidents.

VI

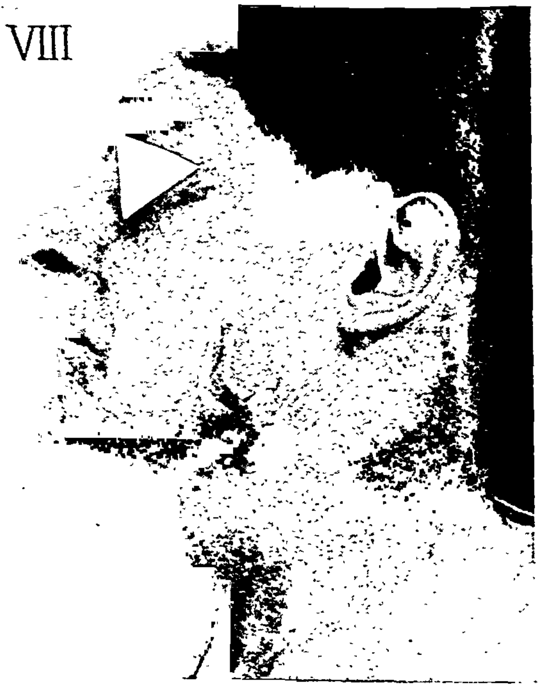


In this case radio-epidermitis appeared on the 28th day after the beginning of treatment. This photograph was taken on the 11th day of the radio-epidermitis, when repair is being accomplished by groups of epithelial cells arranged in a semi-circle at the periphery of the lesion.

HIGHLY DIFFERENTIATED CANCERS

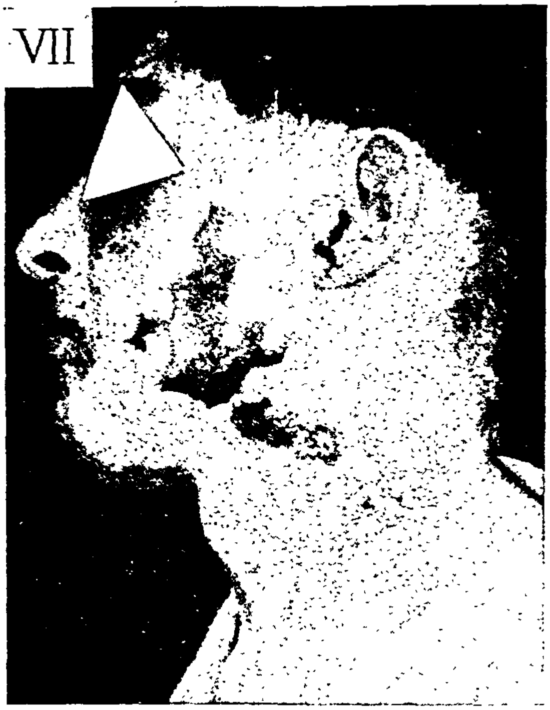
In the treatment of highly differentiated, radio-resistant, extensive, and deeply situated cancers it is quite a different question. The time factor is predominant. The question of energy, dose, and destructive effect gives place to the question of radio-evolution and evolutionary chronology.

VIII



Thirty-fourth day. A linear cutaneous lesion remains. Very slow repair.

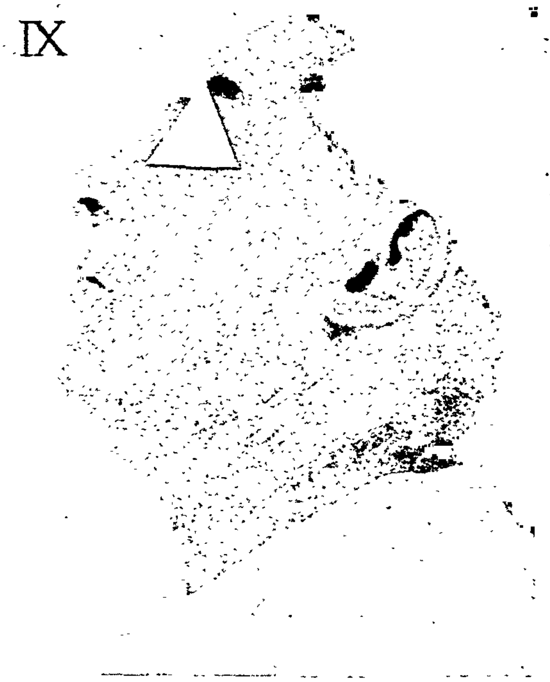
VII



Sixteenth day of radio-epidermitis. Repair goes on only from the periphery. No central islands of epithelium.

The supporting tissues play a predominant rôle. The action of the X rays seems to be indirect, slow, and late. The energy carried each day to the cells ought to be feeble, since it aims at slowly bringing about the evolution effect, that is, the maturation of the cancer cells. It seems only possible to achieve this if the neoplastic cells assimilate little by little,

IX



Forty-third day. Repair with central scar and late œdema. The duration of radio-epidermitis has been much too long.

according to their needs, part or all of the slowly delivered energy. If the energy is delivered too rapidly or in too short a time, if it is *greater than that* which the cells need, the excess of energy seems to be absorbed by the vasculo-connective tissue and by the general tissues. Modifications of the vasculo-connective tissue result from this and appear to reduce or annul the evolutionary process.

RADIO-EPITHELITIS OF CANCER CELLS

Embryonic epitheliomas are sometimes covered with thick false membranes some days after the beginning of irradiation. If the cancer is not infected, one can thus witness the early appearance of radio-epithelitis of cancer cells. The false membranes may be confluent from the sixth or seventh day. They therefore precede by some days the radio-epithelitis of the fourteenth day, that is to say, of the normal epithelial cells which surround the cancer. The *radiosensitivity of the cancer cells* is at this time definitely greater than that of the normal neighbouring mucosa. In these cases cure is usually easily obtained, even after a treatment of short duration. If the cancer cells are covered with false membranes some days after the appearance of the radio-epithelitis of the normal surrounding mucous membrane, it is because their radiosensitivity is less than that of the mucosal cells. Cure is more difficult to attain and necessitates a longer period of treatment.

Among the differentiated cancers only the stratified epidermoid epitheliomas and the cylindrical-celled epitheliomas give rise to radio-epithelitis and in an inconstant manner. When *it appears it is always very* late. It is produced a long time after the radio-epithelitis of the *stratified mucosa* which is spread between the fourteenth and the twenty-eighth day. It sometimes appears towards the thirty-fifth day, at other times towards the forty-second, and at still other times towards the fifty-fifth day, according to the type of epithelioma.

Summary

The two principal factors in X ray therapy are the energy and the time. They must be considered in their relation to the cancer cells on the one hand, and on the other hand to the vasculo-connective tissue and the general tissues of the site from which the cancer is developing.

In the course of treatment the principal guides have been, for us, the *radioreactions of the vasculo-connective tissue*, the radioreactions of the covering epithelium, and the radioreactions of the cancer cells.

When one is irradiating a cancer of very small size and very embryonic in type, the treatment can be completed in a short time, about 20 days; the epithelial radioreactions may be relatively intense, on condition always that their duration never exceeds 15 days.

When one is *irradiating a cancer* less embryonic in type, the treatment ought to be of longer duration, and the epithelial radioreactions ought to be slight.

When it is a question of a very extensive cancer, irradiated through fields of large dimension, as in the case of cancer of the uterus, the treatments ought to be from 40 days as a minimum; the cutaneous radio-epidermitis ought not to be exudative; and the radio-epithelitis of the vaginal, intestinal, or vesical mucosa ought to be very slight. Symptoms, even temporary, of cystitis, proctitis, or enteritis, ought to be avoided.

The question of energy—i.e., of the cancericidal dose—is essential in the treatment of an undifferentiated embryonic, radiosensitive cancer, and it is more important than the question of time. The energy seems to be directly destructive; the chronology is, *above all, protective*, since it allows the preservation of the supporting tissues in order to avoid accidents.

The question of time is more important than the question of energy in the *treatment of a differentiated*, radio-resistant cancer. The energy ought not to provoke a destructive effect. Thanks to a slow chronology and to weak daily doses, the disappearance of the cancer cells seems to follow a cellular evolution resembling the normal evolution. In determining the longer duration of treatment one should aim at the perfect preservation of the supporting tissues so that the evolution effect may become possible.

In conclusion, I would say that it is still absolutely necessary to bear in mind that:

1. The cure of cancer by X rays is still difficult.
2. The cure of cancer by X rays is still dangerous.
3. A very small margin exists sometimes between the dose which will determine a cure and the dose which will provoke an injury.
4. The daily examination of the patients is necessary; modification of the normal tissues and of the general condition by X ray treatment sometimes appears so quickly that it is often necessary to diminish the daily dose or the size of the fields in the course of the treatment.

There exists no fixed method of treatment but a simple clinical treatment for each *individual patient* and for the special type of tumour.

I would like to express my gratitude to the directors of the Marie Curie Hospital for the great honour they have done me in inviting me to speak here on the occasion of the opening of the new X ray department, and to Prof. Regaud, chief of the Institute of Radium of the University of Paris, who, for 15 years, has helped me with valuable advice. I have also to thank Dr. Jean Riach for translating this lecture.

THE DANGEROUS MULTIPARA *

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MY object in writing this paper and giving it a sensational title is to remove if possible, once and for all, from the mind of the reader the idea that a primigravida means a difficult labour but a multipara an easy one. The primigravida gives the impression of difficulty just because she is an unknown entity, and more attention is focused on her both in pregnancy and labour than on the woman who has "done it before." But it is altogether a mistake to suppose that in childbearing practice makes perfect. Furthermore, the multipara is probably more important to the State than the primigravida, and demands equal care. She is the more skilled housekeeper and she knows the weaknesses of her husband; she is the mother of one or more *children, and it may* be taken as an axiom that mothers cannot be replaced.

During the first four years of my Mastership, in 8333 births in the intern department of the Rotunda there were 4975 multiparæ, a percentage rate of over 59. Among them there were 34 deaths, or 0·7 per cent., and this mortality was slightly higher than that of primigravidæ (0·67). An interesting study from the Department of *Health for Scotland* shows that while primiparæ have a mortality 7 per cent. under the average and 2-paræ nearly 40 per cent. under, from the fifth pregnancy the rate of mortality is over average by an amount which increases steadily and speedily until in women bearing their tenth child or more the mortality is five times as high as for all women bearing children.

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* Portion of a paper read at the fourth annual meeting of the Central Association of Obstetricians and Gynæcologists, Memphis, Tennessee, U.S.A.

THE WOMAN WITH THE PENDULOUS ABDOMEN

There is no more difficult proposition in midwifery than the woman with the pendulous abdomen. First, the abnormality may be missed until it is too late to act, and secondly, the presentation may become abnormal after the time when it is possible to correct it with safety for mother and child. The possible outcomes are: (1) occipito-posterior and brow presentations due to the fœtus lying in an incorrect axis; and (2) rupture of the uterus from attrition or actually from thinning of the lower segment due to disproportion.

Contraction ring dystocia due to disharmony of the uterine muscle may be present, and may be due to what might be called natural causes, or to the administration of such drugs as pituitary extract. A strong and loud enough warning cannot be uttered against the use of this type of drug. Rupture of the uterus is common when pituitary extract is administered at the wrong time, and contraction ring may occur. Irregular contraction, with some separation of the placenta, may cause and has caused death of the fœtus.

What can we do to prevent these abnormalities when a pendulous abdomen is discovered or when the patient is seen either in threatened rupture or just leading up to it? This at first seems simple, for a tight binder should work the miracle: alas, this is not so, and danger may speedily become obvious if something is not done. In the early stages, when it is seen that the binder is not doing its job, version must be considered; in later labour version is definitely indicated and the difficulty is to decide on the best time for doing it.

If the patient is seen early, a binder is applied: the attendant should see if the presenting part is being kept in the axis of the inlet. After she has had some labour version must be done if the head is not inclined to fix: if, on the contrary, the head is fixing all will be well and vaginal delivery will be easy. It is very simple to say "perform a version," but if possible this should be left until the time when delivery can be terminated—that is, when the cervix is fully dilated. Sometimes version cannot be postponed so long and it may be necessary to perform it when the cervix is half dilated. On no account must the delivery be completed then. It may be asked if there is risk in this manipulation, and the answer is emphatically in the affirmative: there is risk to the mother if the case is left too long—that is until symptoms and signs of threatening rupture are imminent—and there is risk to the child of prolapse of the cord either during the version or afterwards. Generally speaking, however, prolapse does not occur.

To repeat, if a pendulous abdomen is discovered it must be corrected before danger sets in. This pendulosity may or may not be accompanied by such abnormal presentations as brow, persistent occipito-posterior, and face. Whether these are present or not, version is the proper treatment when the head is not engaging after some labour. I have seen contraction ring dystocia in 10- and 12-paræ, some complicated by marked asynclitism, treated successfully by version. But, on the other hand, a neglected case of this kind will often end in perforation.

A disastrous case of a 3-para illustrates so many conditions that it is mentioned here. There was warning of her trouble, for there had been a transverse presentation with neglected shoulder at the second labour. The pelvis was normal. She was seen antenatally, but it was impossible to get a polar presentation. (This was a case where prenatal care was of no avail.) Even in labour it was difficult to keep a pole down and difficult to turn. Lower-segment section was decided on, but it was found the baby was dead, so she was put back. A contraction ring occurred. It was impossible to reach the neck. The arm was amputated and threatened rupture was present. The thorax was emptied, but the version was so difficult that it took three-quarters of an hour to reach the leg. It was impossible to deliver the head without perforation, so it was delivered by means of two Schultz forceps after decapitation. This patient developed severe sepsis, which was treated by hysterectomy. A large necrotic fibroid with an abscess in the right parametrium was discovered. She recovered. Probably the fibroid was the main cause of all the trouble. Although fibroids are not very common in the very multiparous woman, they must be remembered as a possible cause of dystocia.

Such examples as a 17-para whose labours were normal until the 15th, when operative measures were necessary, and a 20-para who went into threatened rupture after 19 previous normal labours could be multiplied scores of times.

ECLAMPSIA

Some years ago it was thought that eclampsia was essentially a disease of the primigravida. We now know that the multipara is just as liable to it, and when eclampsia develops with her it is probably more dangerous than for the primigravida. It is difficult to tell the reason for this. Probably her kidneys are in a less satisfactory condition than those of her younger sister. She is nearly always comatose; often her blood pressure is quite low, and she secretes but little urine. In the last investigation made the mortality for eclampsia was 1·4 higher in the multipara than in the primigravida. Another point about the multiparous eclamptic is the atypical picture, so difficult that it is well-nigh impossible to know if the case be one of eclampsia or of something else. With the primigravida, once she is over her actual eclampsia the danger is fairly well finished. With the multipara, we often do not know where we are. The following is an unusual case, but exemplifies these remarks:—

A 3-para did not attend the prenatal department. She was admitted with a history of having had two fits. She was very restless. Blood pressure 122/70; semi-conscious. Baby stillborn. She improved after the birth but was restless and difficult to manage; 32 hours after the birth fits began again and continued despite all treatment until she had had 29 fits, when she died. The post-mortem report was atypical for eclampsia and exemplifies not only the danger of eclampsia in the multipara, but also the difficulty of determining whether a patient has eclampsia or not.

Besides eclampsia, all other varieties of toxæmia may be encountered. Toxæmic hyperemesis is a dangerous and often fatal complication for the multipara.

ACCIDENTAL HÆMORRHAGE

This is essentially a disease of the multipara; in fact, so seldom is it seen in the primigravida that when it does occur one is inclined to question the diagnosis, which is more likely to be a very heavy "show," marking the onset of labour, or a missed placenta prævia. During four years there were 148 cases of accidental hæmorrhage at the Rotunda Hospital. Of these 130 were in multiparæ. It should be possible to prevent this disease to a large extent. By getting women to attend the prenatal department regularly, the onset of the kidney condition should be diagnosed and trouble stopped. Too often, however, the patient appears absolutely moribund, with kidneys so damaged that further metabolism is impossible. I do not intend to say anything about treatment except that sub-mammary injection of saline will often save the patient, who will die if local treatment is resorted to too soon.

CONTRACTED PELVIS, DISPROPORTION, MALPRESENTATIONS

It may seem strange that these three are considered together, but they may all occur in the labour of a multipara who has had absolutely normal births on previous occasions. On this account, therefore, she is a very dangerous multipara when any of these abnormalities happen. When disproportion occurs in the multipara the cause must be found; besides pendulosity the principal causes are contracted pelvis, large babies, and malpresentations.

There is no doubt whatever that some women grow contracted pelves or large babies as they become more multiparous. The mystery of the acquired contraction is difficult to elucidate, but it is not uncommon for a woman who has had perfectly normal confinements on all previous occasions to exhibit signs of dystocia perhaps on her eighth effort, and in Ireland "eight" is a common number, while I have seen even the 25-para on not rare occasions. At this eighth effort she shows all signs of delayed labour, and when an investigation is made it is found there is nothing wrong but a marked promontory. Whether this is due to injury of the joint from previous labours or a definite rheumatic affection is a problem; suffice it to say that these cases must be dealt with on the same lines as contracted pelvis in the primigravida.

Increasing size of the baby without change of husband is usual—a fact which was borne out by the investigation of 100 consecutive cases of primigravidæ and multiparæ taken at random. It was found that the average weight in the former was 7 lb. 6 oz. and in the latter 7 lb. 9 oz. The excessive size may not necessitate active treatment, but it may cause trouble, and it is one of the reasons for which the unwary practitioner may find himself in difficulties. This is the type of case where failed forceps and ruptured uterus may be found—the case which requires extreme patience before efforts are made to deliver; in fact, such efforts should not be made until all conditions are fulfilled whereby delivery can be performed without danger.

This is the case, too, where pituitary extract and kindred substances are dangerous, and ruptured uterus may occur when these drugs have been administered at the wrong time. A breech, either arrested at the brim or impacted in the cavity, is probably the most common malpresentation. Many times I have been called to see a very multiparous patient who has failed to deliver herself of a breech—the practitioner having tried every means he knows to help her but without success. There is no contraction ring unless he has been very vigorous in his methods; the baby is still alive. The best method of treatment is to hook the finger into the anterior groin, if necessary pulling with the other hand on the wrist. The method by which the breech is pushed up and the leg brought down has the danger that if movements of the operator are violent, harm to the extent of rupture may result. A very good plan is to put the forceps gently on the breech: traction will then bring the baby low enough to allow finger traction on the groin. If vaginal methods fail, the lower-segment section should be chosen.

Brow presentation must be sought for and treated, while face and occipito-posterior presentation may also be present.

PLACENTA PRÆVIA

Placenta prævia is not a dangerous condition and the mortality should be approximately nil. In 78 cases at the Rotunda in four years there was no death. Of these 70 were multiparæ; this is natural, for the theories of this disease all point to the multipara. In a paper read before the British Medical Association at Manchester, I suggested that the fault lay in the endometrium; that there had never been a repeat case in my practice; and that a prophylactic curettage two months post partum would prevent further placenta prævia. Since that, in collaboration with one of my post-graduate students, Dr. H. E. Canter, I have given further evidence [1] that placenta prævia can be avoided in the multipara. While in no way advocating curettage as a routine for all women with heavy menstruation, there is much to be said for it where a woman has had one or two miscarriages, followed by heavy menstruation; for this is the type of woman who subsequently has a low implantation.

The diagnosis of placenta prævia should be nearly certain without vaginal examination, and this examination should not be made until the operator is ready to perform version, if that is the favoured treatment. Under no circumstances after version should delivery be hastened in any way whatever.

ADHERENT PLACENTA

I have never seen a true case of a morbidly adherent placenta in the primigravida. Retained placenta occasionally requires manual removal because of post-partum hæmorrhage, but very seldom. In the multipara, however, adherent placenta may occur, and as this is one of the most dangerous complications of obstetrics its importance must be stressed. The danger of inserting the hand in the uterus must be especially emphasised, for infection and death are likely to follow. The morbidly adherent placenta is often accompanied by chronic renal disease, so the patient is a bad subject but, even in the absence of this, danger is ever present. May I offer a suggestion in this connexion? When the hand which has been placed in the uterus is removed, it should be reinserted to make sure the uterus is clear. This may have to be done two or three times before one is satisfied. After its withdrawal from the uterus, therefore, this hand must not be removed from the vagina until the operation is complete: in other words, the hand is inserted in the uterus, the placenta is removed, but the hand remains in the vagina.

RUPTURED UTERUS

In four years at the Rotunda there were 10 cases of ruptured uterus, nine in multiparæ; the one primigravida was a case of neglected face presentation after the use of oxytocic drugs. All could probably have been avoided either by careful prenatal care, or by carefully watching the patient in labour, or both. The reasons for rupture were as follow:—

1. The injection of 10 international units of pituitary extract for second-stage delay; this woman was a 3-para who had had two normal confinements. This illustrates the danger of pituitary extract. Even small doses in the early stages of labour predispose to contraction ring dystocia, retained membranes, and post-partum hæmorrhage. The only really safe time is after the third stage is completed.
2. A "quiet" rupture which probably followed an incomplete rupture in a previous labour.
3. Face presentation and contraction ring in a 6-para.

4 and 5. Neglected shoulder.

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[1] Surg., Gyn., and Obst., 1932, liv., 790.

6. Pendulous belly. Rupture followed neglect to perform a timely version.
7. Partial rupture after a previous lower-segment section. Mother and child were saved.
8. Ruptured uterus after efforts to overcome contraction ring.
9. The uterus was ruptured at 18 weeks through faulty insertion of sea-tangle tents.
10. Pendulous abdomen in a 14-para.

FAILED FORCEPS

The practitioner who knows he should not apply the forceps before the cervix is fully dilated in the primigravida may let his conscience slide for the multipara. But let him beware: an undilated cervix, a head in the upper strait, will spell danger if the forceps are applied. The practitioner may be lucky with a few cases where he has applied the forceps too soon, but the day will come when a dead or mutilated mother and a dead or injured child will bear witness to his ignorance of the first principles of midwifery. The importunities of relations or friends constitute no excuse for the failed forceps. High forceps are always dangerous for mother and child; they should never be applied. Mid-forceps spell danger; they may occasionally be necessary. Low forceps is a safe operation.

Among the few examples of failed forceps encountered in the Rotunda, we have found that spontaneous delivery or an easy forceps delivery occurs any time from 6 to 24 hours after admission. Occasionally a lower-segment section has been necessary, and the fact must be stressed that this operation can be done after failed forceps. It is never necessary to destroy a live child.

Vaginal delivery after section is quite justifiable at the present day, but the patient who has had a section *must* be confined in a hospital with proper equipment; signs of threatened rupture in this class of case must be known; these are a red vaginal discharge accompanied by tumultuous movements on the part of the fœtus, with distress demonstrated by rapidity in the fœtal heart rate.

DRUGS

The multipara with the flabby uterus must not be given any oxytocic drug. She may develop contraction ring dystocia even after only grs. 10 of quinine. Pituitary extract and thymophysin may produce the same effect. Several cases of this kind have been admitted to the Rotunda, and A. Probstner[2] has reported five similar cases of which only one survived. It is safer for the general practitioner to reserve pituitary extract for the termination of the third stage.

CONCLUSIONS AND SUMMARY

(1) At the Rotunda Hospital the percentage mortality-rate of primigravidæ and multiparæ is about the same. As the ratio of multiparæ to primigravidæ is about 59 to 41, more multiparæ die than primigravidæ. (2) This danger to the multipara is amply confirmed by a statistical inquiry from the Department of Health for Scotland. (3) The multipara with pendulous abdomen is a grave obstetrical problem. If treatment is not carried out at the correct time dangerous symptoms may arise. (4) The death-rate for multiparous eclamptics is slightly higher than for the primiparæ. (5) Of 148 cases of accidental hæmorrhage 130 were in multiparæ. (6) A multipara with no history of previous disproportion may develop symptoms, either because of the increased size of the baby or some acquired abnormality of the pelvis in a subsequent labour. (7) Of 78 cases of placenta prævia 70 were in multiparæ. (8) Morbidly adherent placenta and ruptured uterus are conditions of the multipara. The danger of pituitary extract before the third stage has ended is great. (9) "Failed forceps" is just as likely in the multipara as in the primigravida.

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[2] Med. Klin., 1930, xxvi., 1785.

OBSERVATIONS ON ROSACEA

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MEDICAL OFFICER, DERMATOLOGICAL AND VENEREAL DISEASES DEPARTMENTS OF THE HOSPITAL

In spite of a number of important investigations on the pathogenesis of rosacea, its ætiology remains obscure. During the past decade or so the most noteworthy additions to our knowledge of the malady have been from Barber and Ryle,[1] Brown,[2] Eastwood,[3] and Stokes and Beerman.[4] The work of these observers seems to point to some gastric fault in rosacea—most probably a low gastric acidity—but all appear to agree that this factor alone is insufficient to account for the complexities of the disease.

Numerous morbid conditions have been considered important predisposing factors in rosacea—e.g., focal sepsis, constipation, intestinal putrefaction, intestinal worms, acute infections of the respiratory tract, chronic worry, the menopause, and certain gynæcological disorders. But amidst all this confusion, the gastric factor seems to stand out as of major importance, and this is confirmed both by the history of the average rosaceous patient and by results of treatment.

The typical patient with rosacea is a middle-aged woman who has had chronic "indigestion" for many years. (The term "indigestion" may be taken to cover a whole gamut of symptoms referable to the stomach.) During this period there has been an insidious onset of the features of the disease. A flush, at first restricted to the post-prandial period, later becomes permanent and may be accompanied by pustulation. The indigestion usually antedates the rosacea and, when the gastric symptoms are prominent, this is aggravated. Conversely, if the indigestion is cured, the face tends to get well, although there may remain a permanent capillary dilatation.

Barber and Ryle[1] in 1920 investigated the gastric function of some cases of rosacea by means of the fractional test-meal. Comparing their results with the normal controls of Ryle and Bennett,[5] they came to the conclusion that low gastric acidity was common in these patients. Eastwood[3] and Brown[2] independently confirmed these results, although their findings were not so impressive as those of the original observers. This low gastric acidity was apparently confirmed by the dramatic results often obtained by the exhibition of dilute hydrochloric acid by mouth, the flushing and indigestion both tending to disappear rapidly. Eastwood pointed out, however, that the results of giving acid could not always be correlated with the test-meal findings and that some cases with normal test-meals responded well to acid by mouth. We, too, have noted the dramatic improvement with acid in three cases of rosacea in which the test-meals showed hyperchlorhydria in two instances and *normal acidity* in the other. It therefore becomes obvious that the response to acid cannot always be explained by the existence of low stomach acidity.

With these views in mind we have studied 40 cases of rosacea during the past year, taking careful histories in each. On the assumption that the gastric fault is the prime factor, we investigated these patients not only by means of fractional test-meals but also by a small series of histamine test-meals, correlating our results with the results of treatment and with the findings on physical examination. Of our 40 cases, 33 were women. The ages of onset ranged from 18 to 68, but the majority of the ages of onset lay around 35 years. Most of the women were married and had had children; many of them had those two curious and well-known findings in rosacea—low blood pressure and cold extremities.

CIRCULATORY DISORDERS

Rosaceous patients tend to have cold hands and feet, often accompanied, in the female sufferers, by "dead" or "white" fingers. The latter is a phenomenon related to Raynaud's disease. Exposure to cold induces whiteness or numbness; as the circulation recovers the fingers become blue or cyanotic before resuming their normal colour. The phenomenon may last a few minutes. "Bad peripheral circulation" has been noted by MacLeod[6] in these patients but, although it is common in rosacea, it is not invariable. "White fingers" occur frequently in non-rosaceous women and in some non-rosaceous asthenic men. A poor peripheral circulation may be found in rosaceous subjects with normal systolic blood pressures or with low pressures. It may also exist in those with hyperchlorhydria and those with hypochlorhydria. As far as we observed, the white fingers and cold extremities go on even when the rosacea and the indigestion are materially improved.

We examined the nail fold of a few of these patients under the capillary microscope. There appears often to be a marked dilatation and even tortuosity of the venous side of the capillary loops. Often, too, there was a terminal "knob" or aneurysm on the convexity of the loop. These changes seem to occur in the winter and to disappear in the summer, but we have made too few observations to do anything more than mention these results. During the winter there is a small exudation of serum from the skin capillaries of the hands of these patients, and this gives the skin of the hands a slight thickening, especially over the knuckle folds of the proximal interphalangeal joints. On the whole, the bad peripheral circulation seems more a background to the disease than the disease itself, but it is undoubtedly of some importance in the ætiology, for it is observed more often in rosacea than in most skin diseases.

As is well known, about a quarter of the cases of rosacea have a low systolic blood pressure for their ages. The lowest systolic blood pressure in our series was 100 mm. Hg. Low blood pressure is, however, not an essential feature of rosacea; indeed, we have notes of one case with a systolic pressure of 180 and of another with one of 200. The blood pressure bore no relation to the gastric acidity or to the severity of the rosacea in our series; neither did the presence or degree of the coldness of the extremities bear any relation to the severity of the rosacea, the gastric acidity, or the blood pressure.

SEXUAL AND ENDOCRINE FACTORS

Dysmenorrhœa was conspicuous by its absence in our series. One patient did complain of a "terrible" pain at the periods, but her neurotic nature made us suspect her statement. The following menstrual irregularities were noted: oligomenorrhœa, 2 cases; irregular periods, 1 case; imperforate hymen, 1 case.

The premenstrual exacerbation of rosacea is an interesting subject for speculation. One observant mother told us that her daughter's rosacea began to get worse 14 days before the monthly period, and was at its worst a day or two before the period began; there was amelioration during the actual period. Now, those cases of rosacea which get well with treatment—say with hydrochloric acid—no longer experience any exacerbation during the premenstruum. It is reasonable to assume, therefore, that the action of the premenstruum is to aggravate the gastric fault in most cases and that the premenstruum is without influence when the gastric fault is removed or corrected. If this were not so, and were the action of the premenstruum independent of the gastric factor, one would expect its action to persist after the gastric fault had been corrected.

In some of the irregular bleedings that occur round about the menopause the face is worse with the uterine loss. Why this is so is obscure. Some of the irregular and excessive bleedings of the menopause are associated with cystic follicular ovaries with an excessive formation of œstrin. It is possible that the connexion may be in this factor.

We treated three patients (one a young girl) with injections of ovarian follicular hormone. We used both Theelin (P. D. & Co.) and Oestroform (B.D.H.). The former we administered in bi-weekly doses of 50 rat units and the latter in bi-weekly doses of 1000 and 2000 B.D.H. units. The treatment, in two cases, was supplemented by oral administration of Oestroform tablets and was continued for three weeks. Although we provoked menstrual bleeding in one case previously amenorrhœic, we noted no improvement in the rosacea on this treatment; indeed, after the cessation of treatment, two of the cases seemed to settle down to a natural recovery.

In very many cases of "menopausal rosacea" there has been indigestion for a great many years before the menopause, and the latter seems to act more in the nature of "the last straw" than as a direct cause of the rosacea. It is probable that the menopause merely aggravates the gastric fault and is therefore quite a secondary matter. In three cases we noted that, although indigestion had been present for ten and even twenty years, it was the advent of the climacteric which precipitated the rosacea. In this type of case the rosacea usually begins before the periods have ceased.

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The above figures show that in rosacea there is no appreciable departure from the normal in the incidence of achlorhydria, and the latter can be taken as a much better guide to gastric secretory dysfunction than mere subacidity, which is, according to some observers, a common finding in any group of women.

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The two things that rosaceous patients cannot tolerate are white bread and very heavy meals. Although white bread is badly tolerated, toasted brown bread is usually well borne. In this connexion the observations of Lehman and Gibson[10] are interesting. They noticed, in a patient with a jejunal fistula, that when toast was eaten only a small amount of liquid material appeared at the fistula, but that when white bread was taken, large, doughy lumps as big as a pigeon's egg were passed.

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Wingate Todd,[11] experimenting with several hundreds of normal students by means of gastric radiography, found that gastric peristalsis was stimulated by lactic acid, buttermilk, alkalis, and tincture of peppermint. The effect of these was well marked, and peristalsis was slow, regular, and deep. Now the sensation in any hollow, muscular organ is an expression of the tension in its muscular coat, and if that organ is hypotonic—as the stomach has often been shown to be in rosacea—it would be much more likely to give expression to its "feelings" after meals heavy in total bulk or in carbohydrate content. This increase of tension in the gastric muscular wall is interpreted by the patient as a feeling of distension or "wind." That this sensation is not actually due to gas is demonstrated by the well-known observation that patients viewed under the fluorescent screen after a barium meal often complain of distension by wind when there is no obvious enlargement of the gastric air-bubble.

Not only does the stomach tend to be hypotonic in rosacea but so also are many of the other muscles, voluntary and involuntary. Barber and Ryle [1] noted the broad, flabby tongue; Rulison [12] observed the poor tone of the abdominal muscles; Eastwood [3] commented upon the low blood pressure; and many have found constipation. The entire absence of any dysmenorrhœa in these patients may depend upon a certain uterine hypotonus. That a large meal causes gastric discomfort in rosacea is in accordance with Wingate Todd's observation that a large barium meal inhibits peristalsis for some considerable time.

The rosaceous reflex must depend on increase of tension in the gastric muscle. Any factor which distends the stomach, which inhibits or flurries peristalsis, or which delays emptying, causes an increase of tension in the muscle and will call forth the rosaceous reflex in a predisposed subject. If this fact is accepted, many of the obscure associations of rosacea can be explained. It accounts for the painful conditions in the alimentary tract; it explains why adverse psychological influences, chronic illnesses, and the menopause can be causative factors.

Wingate Todd [11] noticed that prolonged anxiety caused complete inhibition of all gastric peristalsis and that at the same time there was marked hypotonicity. It is undoubted that painful intestinal or abdominal conditions and many general illnesses cause the same state of affairs. The same observer found feeble peristalsis and hypotonicity in female students during the premenstruum, and this phenomenon ceased when the flow was established. It is certain that anything which makes the indigestion worse will also increase the rosacea, and that the converse is also true. We regard this rosaceous reflex secondary to increased gastric tension as the primary factor in rosacea, for if the gastric neurosis is remedied neither the premenstruum nor any other factor has any influence in aggravating the rosacea. The adverse influence of these factors on the gastric musculature is counteracted by the therapeutic stimulation of the stomach by acids, alkalis, or carminatives; and good, slow peristalsis and good tone will relieve the tension of the stretched hypotonic muscle. Poulton and Stewart [13] have shown that the discomfort associated with distending the stomach by a compressible rubber bag is relieved momentarily when a wave of peristalsis takes the tension off the stretched nerve-endings in the gastric muscle. Similarly, when we give medicinal stomachics to a dyspeptic patient with rosacea, we are protecting the nerve-terminals in her gastric musculature by making her stomach achieve normal tone and good, deep peristalsis.

Of course, the normal reflex of slight increase of face temperature on taking hot fluids is naturally much exaggerated in the atonic capillaries of rosacea. The vasodilatory effect of alcohol and the nasal rubor of acute nasopharyngeal infections is similarly exaggerated in the rosaceous subject. The drinking of alcohol and tea (the latter regarded mainly as a hot fluid apart from a possible direct gastric irritant) therefore merely aggravates the normal reflex and cannot be regarded as a direct cause of rosacea.

Rulison's suggestion is probably correct, that the true place of gastric stimulants, such as mustard and curry, in rosacea is that such aids to digestion are needed by these patients and that unconsciously they are treating themselves. After all, therefore, the acids, alkalis, and carminatives which we administer are to these people merely very effective but rather unpalatable condiments. We provoke efficient gastric peristalsis and tone, and if the gastric acidity is not too high the best condiment appears to be 30 minims of dilute hydrochloric acid with meals; but if the acidity tends to be too high or normal, we run the risk in most cases of abolishing peristalsis and of making both the rosacea and the indigestion worse. This we have observed ourselves on many occasions. There are, however, a few patients with hyperchlorhydria (as we noted above) who can either rapidly dilute the excess acid, or perhaps neutralise it in some way, and in these cases the rosacea and the indigestion are benefited by acid therapy.

TREATMENT

The treatment of the malady is, then, obvious. The following adverse influences on gastric peristalsis should be looked for, and, if possible, remedied: (1) "nervous strain," by which one means any predisposing cause of a psychogenic nature; (2) painful abdominal conditions; and (3) chronic diseases or infections. As to diet, nothing but the avoidance of big meals, especially when taken under emotional stress, and of white bread, is necessary. The best bread to take is toasted brown bread. Luminal, bromides, and psychotherapy may have their uses in improving the all-important psychological factor. An adequate amount of post-prandial rest and exercises will remedy the tone of the muscles.

It is of value to have a test-meal done, in order to see whether the gastric acidity is too high to attempt giving 30 minims of dilute hydrochloric acid by mouth in water with meals. This should be tried, even if the gastric acidity is high, for a day or two. Otherwise peppermint, alkalis, or menthol are the best condiments to administer before meals.

Some patients recover if they are removed into better surroundings, or if their financial circumstances improve, but in a great many cases the provoking factor is irremediable, and has to be counteracted by nerve sedatives and medicinal stomachics. There should be great scope for psychotherapy in these patients.

SUMMARY

(1) The gastric acidity is practically within normal limits in rosacea, as demonstrated both by the ordinary fractional test-meal and by the histamine test-meal. (2) The rosaceous reflex is induced by an increase of tension in the stomach wall. (3) This increase of tension may be due to one or more of the following factors: (a) delay in emptying, (b) feeble peristalsis, (c) an easily distensible stomach due to hypotonia, (d) over-rapid peristalsis, and (e) gastric spasm. (4) The action of hydrochloric acid, alkalis, and carminatives in rosacea is to give slow,

deep, unflurried gastric peristalsis, and good muscular tone. The gastric tension is thereby relieved, the indigestion disappears, and the vasomotor reflex of rosaceous flushing depending on the tension is inhibited. (5) The gastric neurosis is due to many causes, amongst them being adverse psychological influences, poor general muscular tone, and reflex effects from disturbance in an abdominal viscus. In a few cases the reflex may be from a lesion in the gastric mucosa itself—i.e., gastritis or ulcer.

In conclusion we must express our indebtedness to Dr. Barber and Dr. Forman, both for their helpful suggestions and stimulation and for their permission to publish these observations on their patients. Our thanks, too, are due to Dr. L. J. Witts[14] for his expert advice on the histamine test-meals and on other points.

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PSYCHOLOGICAL EFFECTS OF BODILY ILLNESS IN CHILDREN

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THOUGH it is only to be expected that children, in keeping with their sensitiveness to early experiences, will be affected psychologically by bodily illness, this aspect of child psychology seems not to have been dealt with in any article or book. With adult patients, as every doctor knows, illness is often responsible for an exaggerated selfishness and an unmistakable childishness in their behaviour to those tending them. It remains to be generally recognised that the dispositions of sick and invalid children may be subtly and profoundly changed in ways which may persist after convalescence and even throughout life. But since these changes are usually gradual, and a child is hardly able to speak of them, they are not often understood by the parents and are rarely attributed by them to their real origin.

To glance first at the notions which children shape for themselves about illness. It is beyond them, of course, to formulate the explanation which science provides—e.g., that diseases are produced by germs—and their ideas pass through two stages. When very young they believe that illness, with its pain and discomfort, is caused by some living being in themselves—some horrid little man or animal, gnawing and biting at their insides. Later, and for a good many years, they regard illness as a punishment. This they suppose can only be in connexion with something wrong they have done, and their feelings of guilt come into close relation with their notions about illness. In these two levels of ideas may be recognised the stages in the evolution of primitive society: first, the animistic explanation of the universe, and later its religious interpretation, when illness is regarded as inflicted by God by way of punishment for evil living.

BRIEF ILLNESSES

A not unusual effect of a temporarily incapacitating illness is to retard a child's mental development, and even to produce in a younger child an obvious regression of character and intelligence. This is accounted for in part by its restricted activities, but also by certain features of a sick-room. By confinement to bed the child experiences anew the life with which it was familiar in its cot during its first years. Again, in sickness a child is permitted to do little or nothing for itself, and, being tended by its mother, readily slides back into the mental state of its early helpless years. Yet again, its diet is probably restricted to milk—its food during its first years—and this, too, helps in making it babyish again.

With briefer illnesses the retarded development may be noticeable only for a few weeks afterwards, but in others the psychological effects may be more lasting, and may continue even into adult life, for example when the illness has been accompanied by suffocative symptoms. These are always peculiarly terrifying to children, and may leave behind a morbid fear of suffocation. An attack of pneumonia may be the exciting cause, though a severe sore-throat or even adenoids, by obstructing the air-passages, is often responsible.

Another effect is to intensify the fear of death. Sick children readily become troubled by this fear, and this may explain otherwise perplexing details in their behaviour. In cases of heart disease especially the fear may grow to large proportions. Children with this disease seem to acquire early the knowledge that it is often fatal, even suddenly fatal, and their concern about themselves may be very real. Sometimes this information has come by reading, or it may have been imparted by another child; but often it is overheard by chance. Doctors themselves, in the remarks they let fall in a child's sick-room, do not always remember how alert a child's ears can be, and how readily a casual word may be picked up and become the source of a secret fear for years after. Not a few healthy adults who, as children, were the suspected subjects of heart disease, go about in fear of dropping dead, because of a whispered conversation, overheard or half-heard, between doctor and mother.

An interesting effect of illness to be noted in "nervy" children is that not a few of them are speedily relieved of their neurotic symptoms when confined to bed. These are the cases in which the nervous trouble is bound up with jealousy of a brother or sister in the mother's affection. Illness secures to the invalid something of a monopoly of the mother's care and attention; for the time being the jealousy is allayed, and with it the nervous symptoms.

Psychological changes may also follow a surgical operation. All too often children are operated on without a word of preliminary explanation, even from those they trust. Indeed parents and others may conspire to keep a child in ignorance; or, worse, will deceive it by lies. The experience is usually neither forgotten nor forgiven by the child. It feels betrayed by those whom it loves best, and henceforth a barrier of mistrust is likely to stand between it and its parents. Another common effect of an operation is to leave a child frightened, even terrified, not only about doctors but in its everyday life also. Many a child has had its normal, happy self-confidence permanently changed to fear and timidity after taking part in a "field-day" at a hospital throat department, where tonsils are removed wholesale in a scene of blood with children crying and vomiting all round. Or again, to operate without an anæsthetic, in the mistaken belief that a child feels little and notices less, has often been the occasion of a deep-going emotional shock. On the other hand, an anæsthetic given unskilfully may make a child think it is being deliberately suffocated, and the terrifying effects may be lasting. The dread of anæsthetics felt by many adults may sometimes be traceable to a single experience of this sort in childhood.

In cases of accident children are quick to fear that they are going to die. Without a prompt word of reassurance from doctor or relative, they may be left with an exaggerated fear of death; and this for years to come may baulk them in many of their activities, including school games which involve any risk to wind or limb. On the other hand, a minor accident may be as enjoyable to a child as a minor illness. A boy, for example, with a hurt hand or head, who has to wear a bandage which others can see, may feel as happy and proud as a national hero. Nevertheless, the psychological shock following a serious accident may be deep and lasting, as the following example shows.

> Perhaps the severest civilian case of shattered nerves in my experience is that of a man in his twenties who shook incessantly from head to foot; he lacked self-confidence, avoided all social relations, and shunned every responsibility. A thin scar across his neck from side to side helped to elicit the history of the event that shattered his nerves. He was an only child, and one night when he was about eight his mother, a widow, committed suicide, having first come to him asleep in his room and attempted to kill him by cutting his throat. Any more devastating experience for a child could hardly be imagined, for, apart from tragically losing his surviving parent and in addition to his attempted murder, he lived to realise that it was the one he loved best in the world who had intended his death.

When convalescence begins after an acute illness children are often irritable. This is an expression of ennui felt by a child whose energy is returning faster than the restrictions on its activities are relaxed; and once the child is up and about the irritability soon goes. Most children are glad and eager to resume an active life, but some really enjoy being ill—once the worst is over—and may be little disposed to hasten their convalescence. The outstanding advantage in prolonging their recovery is to continue, if at home, to preoccupy their mother's attention to the exclusion of the rest of the family, and if in hospital, to be spoiled by the nurses.

CHRONIC AFFECTIONS

It is in chronic infirmities of any kind that the most insidious and deep-going effects may be traced, so considerable is the interference with a child's normal daily life. Common examples of these chronic conditions are infantile paralysis, depriving the child of the use of one or more limbs; heart disease, severely handicapping its activity; congenital deformities like club-foot; and the crippling tuberculous disease of joints or spine which entails confinement to bed for perhaps months or years. In addition, facial disfigurements, such as congenital nævus (port-wine stain), hare-lip, and squint, by being noticeable by everybody, often react on a child's mentality; while even defective sight, when glasses are worn, may have a similar psychological effect. Any child with a chronic disability feels first and foremost that he is different from other children. He sees himself as in some way marked off from them, and of course his life may actually be solitary. Moreover, enforced inactivity may always be there to make him realise that he is not as others.

Of all the harmful effects perhaps the most frequent is an inferiority complex. This arises partly from the fact of the disability itself, which tells the child beyond any question that he is inferior in certain respects to other children; but even more it takes origin in his sense of guilt, and his line of argument seems to be the following. Illness is a punishment for wrongdoing and sin. Since then he is being punished in this way, he believes he must be wicked, though just what his sin is he has little idea. The acceptance of the belief, however, leads to mental depression, usually with periods of remorse in which he fervently wishes he could undo his offence. Nevertheless, alongside this runs another line of thought, when he assures himself that he is innocent of any wrongdoing. As the next step he begins to feel he has been punished unjustly, and regards himself as the innocent victim of the world around him. His hostility is roused against God and especially against his parents. His feelings against the latter become all the intenser when he reflects that it is to them that he is entitled to look for protection, and that, by having failed to safeguard him against his physical disability, they have served him very badly indeed. He comes to blame them for his infirmity, and as he settles to a more or less sustained antagonism, the whole atmosphere at home is changed. And yet, as he is almost certainly unable to put his grievance into words, his parents are little likely to be able to do anything to remedy the unhappy situation. Much more probably their own unfriendliness will be stirred against their tiresome, provocative child. In the end, and most damaging of all, he is driven to the conclusion that on account of his wrongdoing he has become unlovable by his parents; and nothing so undermines a child's self-confidence as the belief that he is unworthy of love.*

REACTION OF SUPERIORITY TO INFERIORITY

An inferiority complex may come to be replaced by a superiority complex. We know that some traits of character arise as "reactions" to existing traits of the contrary kind. For example, the feeling of sympathy, which is lacking in very young children, appears later as a reaction to the impulse of cruelty which is implanted even in infants; or there is the well-known instance of the Athenian, Demosthenes, who grew up with a bad stammer but became the greatest orator in ancient times. Similarly a child with an inferiority complex may later develop a superiority complex, endeavouring in this way to bolster up his self-confidence by hiding his inferiority under a show of loud and perhaps aggressive superiority. A similar reaction to a physical handicap may of course be widely seen in adults who are undersized (dwarfs especially), misshapen, or very ugly. With these the feelings of superiority often take the form of obvious conceit.

Another common harmful effect is a supersensitiveness to a physical defect, especially one like a club-foot or a birth-mark on the face, that can readily be noticed by others. Byron the poet was born with a club-foot to which he grew up so sensitive that even at the height of his fame he would not willingly have it noticed; and at social gatherings he would arrive early and take up his position in the room, so that the other guests might not see him limp. Not all children, however, are sensitive in this way, and young men with club-foot are known to me who are troubled by it not at all. Equally I have known two young women whose faces were disfigured by birth-marks; one of them had grown so sensitive about it that she avoided social relations and went out only after dark, while the other contentedly followed an everyday life.

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* And, let it also be said, nothing so ensures a child's self-confidence as the knowledge, sustained by a not too infrequent expression of the fact, that he is loved by his parents.

It seems, therefore, that the deformity itself cannot be responsible for supersensitiveness, and that for the explanation we must look deeper. The psychological reaction in these cases depends on the child's sense of guilt. If this is exaggerated, it readily attaches itself to the idea of a bodily defect, and the child grows morbidly sensitive about it. These feelings of guilt are held to originate in an over-strict unbringing by the parents in the earliest years, especially in the matter of masturbation. Though this is a natural habit in children, the more they are shamed about it by their parents the stronger becomes their sense of guilt.

Invalidism may be responsible for undue selfishness, perhaps associated with self-assertiveness, in a child who has been pampered on account of ill-health. Such children when they grow up must share the fate of all egoists, and suffer many a hurt to their feelings from a seemingly unkind world. Similarly, self-pity may result from invalidism. As a form of masochism, it is a normal ingredient in child character and is often, of course, to be recognised in adults; but the intensification of it in a child as a result of illness, and especially of numerous illnesses, is generally attributable to mishandling by too sympathetic parents.

Yet another harmful reaction is jealousy directed against children who are fortunate enough to be sound in health. This, too, may lead to a sense of grievance which tends to set the child against the whole world. This embitterment on the one side is only too likely to provoke hostile feelings in the other members of the family, and things may go from bad to worse. Again, the position that is now brought about is that in which the child perceives that it is not loved, and it retaliates by indulging in deliberate naughtiness in the hope of annoying its parents—the situation which must have been in Shakespeare's mind when he made the hunchback Richard III threaten, "Since I cannot prove a lover . . . I am determined to prove a villain." By the time a child has settled down to prove itself a villain in its parents' eyes it has said good-bye to its happiness, and it may well grow up to display the same disagreeable character to the world in general. Not a little of the gratuitous offensiveness, and even worse, that is met with in adult life originates in this childhood experience of not being loved.

Even a child who is strong and healthy may easily become convinced to the contrary if he has a mother of the fussing type. Such a mother is for ever worrying and taking precautions lest her child should fall ill, until in the end the child is unable to believe that he is any but a poor creature to be shielded from the ruder blasts of life. Many of the healthy men and women who are convinced that they are "delicate," and accordingly plan their daily lives on semi-invalid lines, owe their erroneous belief to mothers of this kind.

This point is well illustrated in the following incident. A mother brought her girl of three—an only child—to me with a covering letter from her doctor saying that though he had repeatedly been called to see the child he had never detected anything amiss, and as the mother seemed dissatisfied on this account they had agreed to take a specialist's opinion. My examination equally disclosed nothing wrong, physically or psychologically; the child in fact was an exceptionally fine specimen, and one of whom any parent might well be proud. But on my breaking this news to the mother, her instant rejoinder was, "Oh, but how dreadful! I'll have nothing to worry about."

Not all mothers, however, fuss over their children, even the sick ones. There is a sort of mother who firmly makes it her business to discourage "going sick" as a weakness, if not a crime, and in her Spartan home a child hardly dares to speak of its genuine aches and pains.

SECONDARY GAIN

A very familiar aspect of neurotic illnesses in adults is known as "secondary gain": it is the utilisation by neurotics of their nervous disabilities in order to gain some advantage for themselves, such as evading disagreeable duties. The motive is also to be found in children. One child uses its physical disability to secure an extra share of parental affection, especially in rivalry with any brothers and sisters. Another endeavours—often successfully—to make itself the centre of family importance. Another, again, turning its disability to selfish ends, tries to get its own way by playing on its mother's feelings with a threat of another attack of its symptoms, whatever they may be, unless it is given in to. In this way it not infrequently succeeds in dominating her altogether. Yet another manifestation of this secondary gain is, as with adults, in escaping unpleasant tasks such as going to church or to school.

Finally, not all the effects of invalidism are necessarily harmful, and a few of them can fairly be entered on the credit side. For example, a child with some lasting disability, gradually realising that neither cure nor relief is possible, may develop an exceptional fortitude of character which is likely to be an asset to it in later life. Again, physical inactivity tends to make a child indulge unduly in phantasying—a habit which, though it favours the development of a dreamy and unpractical nature, also provides exceptional opportunity for ambitious phantasies; and these may remain as a powerful driving force behind its adult enterprises. The association of physical inactivity with phantasying favours also the growth of the contemplative faculties, with an outcome that may sometimes be seen in the later choice of a vocation such as authorship or art.

THE ATTITUDE OF PARENTS AND TEACHERS

This brief survey would be incomplete without recognising that the subject has another side—namely, the emotional reactions of adults themselves to bodily infirmity in children. The usual effect in parents is to quicken their sympathies and so increase their love and concern for their infirm child. The risks inherent in this have already been indicated. In other parents, however, the reaction is one of disappointment that a child of theirs should be physically unsound. Their self-esteem is hurt, and they become, if only unconsciously, ashamed of their offspring, and treat it accordingly. Sometimes this disappointment leads to an active dislike of the child. As part reason for this there may be the expenses of the child's illness, entailing personal sacrifices by the parents; but in addition their sadism is likely to be provoked, and their attitude to the child is one of unkindness or even cruelty. Yet another reaction of the parents may often be noted in cases of congenital deformity. Many parents unconsciously regard a deformity of this kind as a reflection on themselves; their sense of guilt is stirred, and they may even hide away their child from sight of neighbours, doctors, and others.

School teachers also show emotional reactions to an infirm child. In fact no teacher is without a response of some kind, usually of sympathy or antipathy. An exaggerated sympathy is probably more characteristic of the woman teacher, and an unreasonable dislike of the man teacher. An infirm child, therefore, will hardly encounter in its classroom an ordinary emotional atmosphere. Add to this that schoolmates, boys especially, are notoriously intolerant of physical infirmity, which they are apt to treat with contempt and jeers.

Neither at home, then, nor at school, is an infirm child likely to experience the normal emotional environment which is needed for normal psychological development.

THREE CASES OF
TUBERCULOSIS OF THE CENTRAL NERVOUS SYSTEM IN CHILDREN
APPARENT CLINICAL RECOVERY

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In the course of an investigation of cases of tuberculous meningitis and glandular tuberculosis, which is being carried out on material available in the Royal Edinburgh Hospital for Sick Children and other Edinburgh hospitals, three cases have been observed which indicate that active tuberculous infection of the central nervous system, associated with the presence of tubercle bacilli in the cerebro-spinal fluid, does not necessarily proceed immediately to progressive and fatal tuberculous meningitis. Tubercle bacilli were isolated from cerebro-spinal fluid of these patients, while their subsequent history suggests that the lesion in the nervous system has been at least temporarily arrested.

Examinations are being made of specimens of cerebro-spinal fluid obtained not only from cases in which the clinical diagnosis of tuberculous meningitis is established, but also from patients who show only slight clinical evidence suggestive of an intracranial lesion with, in addition, a positive reaction to the tuberculin test. In the routine bacteriological examination, each specimen of cerebro-spinal fluid is injected subcutaneously into the groin of one or more guinea-pigs, and from one to three months later the animals are killed and examined for the presence of tuberculous lesions. If an animal is infected, differential media are inoculated with material obtained from the regional lymph glands draining the area injected.

In the three cases recorded in this paper, injection of cerebro-spinal fluid led to infection of the guinea-pigs by the tubercle bacillus. Culturally the following characteristics were noted: (*a*) In Cases 1 and 3 the growth was of the dysgonic type, indicating infection by the bovine type of tubercle bacillus. (*b*) In Case 2 the growth was of the eugonic type, indicating infection by the human type of tubercle bacillus.

CASE RECORDS

Case 1.—A. B., aged 1 year and 7 months, was admitted to the Royal Hospital for Sick Children as a case of acute pleurisy. There was a history of cough, fever, and lassitude for eight days, and heavy breathing for three days. Vomiting occurred on the evening of onset of the illness but on no subsequent occasion. His only previous illness was measles at the age of 10 months. At the time of admission the child was in a weak undernourished state, uttered frequent cries, and continually rocked his head as if in pain. The fontanelle was small but tense. Pupils were equal and widely dilated. The Kernig reactions were negative, and there was no nuchal rigidity and no tâche cérébrale. Both ear-drums were red and bulging. Marked percussion note dullness with diminution of breath sounds and vocal resonance were noted at the left base, and aspiration was attempted without result.

The day after admission lumbar puncture was carried out, and water-clear cerebro-spinal fluid obtained under increased pressure. On microscopical examination of the fluid no tubercle bacilli or other organisms were found. There was no increase in cells, and biochemical analysis gave the following results: total protein, 40 mg. per 100 c.cm.; chlorides, 700 mg.; sugar, 0·060 per cent.; gold test, no precipitate.

After lumbar puncture there was some improvement in the child's condition, and the temperature, which had varied between 101·2° F. and 102·8° F. since admission, fell on the third day (March 25th) to 98° F. On March 29th the restlessness which had always been a feature became worse, and was associated with a rise in temperature. Paracentesis of the right ear-drum was performed with resultant relief and return of the temperature to normal. The patient was sent home on April 3rd. Three weeks later, on April 24th, he was readmitted on account of marked respiratory distress. The physical signs in the chest were similar to those found on March 23rd, except that there were in addition fine crepitations at both bases. The knee-jerks were diminished, the abdominal reflexes absent, and there was resistance to flexion of the neck. The child was very restless and continually holding his head in his hands. The tuberculin skin test was positive. At the time of readmission the temperature was 103° F., and it continued to swing between 98° F. and 103° F. for five days. Paracentesis of the left ear-drum was carried out on April 29th, blood and pus being obtained, after which the temperature settled and the child's condition greatly improved. The boy was kept in hospital a further week and discharged in good health on May 8th, 1933.

The child was visited in his home on Jan. 17th, 1934, eight months after discharge. He showed signs of bony rickets associated with a moderate pallor and laxity of the ligaments. The abdomen was prominent, but this appeared to be part of the rickets. Since his discharge from hospital the previous May the child had had several colds but otherwise progress had been uneventful.

Case 2.—C. D., a boy aged 2 years 3 months, was admitted to hospital on April 17th, 1933. His only previous illness had been measles in April of the previous year. There was no history of disease in the family, and the housing conditions were good. Five days before admission the boy vomited but appeared to have completely recovered within an hour. Two days later vomiting again occurred and was accompanied by fever and loss of appetite, and the child kept his head held in his hands, as though in pain. Next day (April 15th) he was unable to stand on account of "weakness in the legs." On the 16th he lost the power of his right arm but regained this by the evening. He was extremely irritable during examination following admission to hospital. He appeared to suffer discomfort on palpation of the neck and kept his head inclined to the right side. There was slight resistance to flexion of the neck. A flaccid paresis of the right leg was present associated with loss of tendon reflexes. The knee- and ankle-jerks were diminished on the left side. Plantar responses were both flexor, and the Kernig tests gave negative results. There was no weakness of either arm.

On April 19th flaccid paresis of the right leg and slight neck rigidity were still present and lumbar puncture was carried out; 50 c.cm. of clear cerebro-spinal fluid were withdrawn under pressure. A small coagulum formed in the fluid on standing. A cell count gave 130 per c.mm., and lymphocytes were in excess of polymorphonuclear cells. No organisms were found on microscopic examination. Biochemical analysis of the fluid gave: total protein, 80 mg. per 100 c.cm.; chlorides, 643 mg.; sugar, 0·132 per cent.; gold test, no precipitate.

On April 21st the temperature was 97·4° F., and remained at this level for three weeks after varying between 97° F. and 99·4° F. during the first four days in hospital. By the 24th neck rigidity had disappeared but the boy still remained abnormally irritable for two weeks after admission. During the patient's fifth week in hospital the temperature showed a slight tendency to irregularity, on one occasion rising to 99° F. About this time the pulse-rate became more rapid, and there was a slight loss in weight. Pulse and temperature settled and the patient was discharged to Challenger Lodge as a case of poliomyelitis on July 6th with paresis of the right leg still present.

The boy was seen on Jan. 21st, 1934, six months after discharge. There was considerable wasting of all the muscles of the right thigh and leg, but limited voluntary flexion and extension at the ankle-, knee-, and hip-joints could be carried out. Knee- and ankle-jerks on the paralysed side were absent; on the left side they were noticeably increased. The plantar responses were both flexor and both Kernig reactions were negative. Nothing else of note was found on examination. The boy was able to move about with the aid of a splint and his general health was good.

CASE 3.—E. F., a girl aged 4 years and 6 months, was admitted to hospital on August 3rd, 1933. Ten days previously she had been involved in a motor accident receiving injuries to the legs and left hand; she was not rendered unconscious, and when treated for her injuries nothing was found to suggest the presence of intracranial damage. She appeared to be in normal health until the sixth day after the accident when she was noticed by her mother to be drowsy. The same day (July 30th) she was incontinent. The drowsiness persisted to the time of admission. Throughout the day of July 31st she complained of a severe headache which disappeared by the evening and did not return. On the night of August 2nd she complained of pains in the back and right side, became delirious, and ran a temperature of 104° F. At the time of admission the child was lethargic and the temperature was 100° F. The next day she was more drowsy and irritable during examination; 10 c.cm. of clear cerebro-spinal fluid under slight increase of pressure were obtained by lumbar puncture. The fluid showed no increase in cells, and no tubercle bacilli or other organisms were found in it microscopically. Biochemical tests of the fluid gave the following results: total protein, 50 mg. per 100 c.cm.; chlorides, 720 mg.; sugar, 0·07 per cent.; gold test, no precipitate.

The day after lumbar puncture the child's condition began to improve; the improvement was maintained and she was discharged from hospital on August 12th after examination had eliminated the possibility of a cranial lesion. Next day she had a severe fit at home which lasted fifteen minutes and was associated with twitching of the right side of the face, right arm, and leg. She was troubled with retching after the fit and remained drowsy for the rest of the evening. She was readmitted to hospital the following day (August 14th) and the same evening had a severe fit, this being followed by vomiting and prolonged drowsiness. Two days later the girl was allowed up, and up to the time of discharge on August 24th was extremely active. Beyond a slight rise in temperature following the fit she was afebrile during the time in hospital after readmission. The tuberculin skin test was positive. The exact nature of the condition was not determined but a tentative diagnosis of epilepsy was made.

On Jan. 17th the girl was seen in her home, five months after discharge. Since leaving hospital she had continued to make uninterrupted progress and when seen was in excellent health. Her previous health is of interest. Between the ages of two and three years she had whooping-cough, chicken-pox, and German measles. At the age of three and a half years she had three severe fits all involving the right side which were never satisfactorily explained and which did not recur. The girl comes of a family known to be tuberculous. She is the second youngest of ten children, two of whom died at the age of six months, one following pneumonia and the other from tuberculous meningitis. Of those alive one sister suffers from abdominal tuberculosis and a brother and sister from pulmonary infection. The father also is tuberculous.

COMMENT

Recovery from tuberculous meningitis, though extremely rare, is not unknown. In a careful review Cramer and Bickel [1] collected 46 cases, including one of their own, which were confirmed either by demonstration of *Bacillus tuberculosis* in the cerebro-spinal fluid or by production of tuberculosis in guinea-pigs by injection of cerebro-spinal fluid, the latter test being positive in 20 cases. In many of these recovery was temporary, and death followed within a few months from recurrence of meningitis or from the effects of tuberculosis elsewhere. In some, permanent sequelæ remained. Martin [2] collected 20 undoubted cases reported since 1894.

All these seem to have presented fairly definite clinical evidence of tuberculous meningitis, though Cramer and Bickel mention three cases in which the symptoms were abortive; and Martin suggests that recoveries are possibly more frequent than has been believed, and that very mild cases which result in recovery may pass unrecognised.

Those in our series are remarkable for: the absence of the classical evidences of meningitis; the extreme mildness and transience of such nervous symptoms and signs as existed; the absence in two of the three of any definite chemical or cytological change in the cerebro-spinal fluid; and the absence in the same two of any sequelæ up to the present time. None of the three was, in fact, at the time of the attack, thought to be suffering from meningitis at all. They seem, therefore, to fall into a somewhat different category from previously reported cases of recovery from tuberculous meningitis. We believe that the proved occurrence of such cases as these may throw new light on the problem of the pathogenesis of tuberculous meningitis.

In an important paper on this subject Rich and McCordock [3] published evidence from which they concluded that the prevalent teaching—that tuberculous meningitis is part of a general miliary (blood-spread) infection—is incorrect. They claimed that careful examination of the brain will show in practically every case that the meninges have been infected from an older focus in the vicinity, most often in the brain substance, from which tubercle bacilli have escaped in large numbers into the subarachnoid space. They contend further that the diffuse exudative reaction characteristic of meningitis can occur only if there be introduced into the subarachnoid space a number of bacilli in excess of what is likely as a result of even the most severe miliary tuberculosis. They support these contentions by evidence from experiment and from human cases after death.

If this view be correct it follows that a patient who develops tuberculous meningitis has, at some previous time, suffered an infection of his central nervous system by tubercle bacilli, which have set up a localised lesion—probably a caseous nodule (tuberculoma) superficially placed in the brain substance, or a circumscribed caseous focus in the meninges (meningeal plaque). It seems probable that the occurrence of this initial infection might in some instances be marked by clinical evidence, probably slight and transient, of a pathological process within the central nervous system. It is in the hope of obtaining some further light on this problem that we are including in our investigation specimens of cerebro-spinal fluid from children, such as these three, in whom the tuberculin test is positive and who present clinical evidence of meningeal irritation or other nervous lesions, but in whom tuberculous meningitis in the clinical sense is not present and does not develop during the child's stay in hospital.

We are as yet unable to offer proof that this suggested explanation of the facts here recorded is correct and that these incidents in the patients' histories coincided with the setting up of circumscribed lesions in brain or meninges, which may eventually cause meningitis. The subsequent history of these children will be of much interest.

One conclusion, however, seems clear. In the light of the facts recorded it is necessary to recognise that any clinical evidence of meningeal irritation or cerebral lesion, no matter how slight and transient, in a patient in whom the tuberculin reaction is positive, may be an indication of tuberculous infection of the central nervous system, even in the absence of clinically active tuberculosis elsewhere in the body, and of any definite cytological or chemical abnormality in the cerebro-spinal fluid. And the recognition of such an incident in a patient's history as a danger signal may be a step in the direction of prevention of the deadliest of all forms of tuberculosis.

We wish to express our thanks to Prof. Charles McNeil, Dr. Lewis Thatcher, and Dr. Douglas Nicholson for permission to publish the cases, and for the use of clinical records of patients under their care; also to Lieut.-Colonel W. F. Harvey and Dr. W. O. Kermack, of the laboratory of the Royal College of Physicians of Edinburgh, for cytological and chemical examinations of cerebro-spinal fluids. In the case of one of us (H. J. R. K.) the work reported in this paper was carried out during the tenure of the Kirk Duncanson fellowship for medical research.

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CYCLOPROPANE ANÆSTHESIA IN OBSTETRICS

BY WESLEY BOURNE, M.D., M.Sc., F.R.C.P. Canada

(From the Royal Victoria Montreal Maternity Hospital, Canada)

BY the work of Henderson and Lucas [1] done on lower animals at the University of Toronto, by their discovery that cyclopropane possesses anæsthetic properties, by their studies of its percentages anæsthetic concentrations, by their findings concerning its effects on the circulation and respiration, and by their investigation of its influence on metabolism, they were justified in suggesting that it may be developed as a safe anæsthetic for man.

From this suggestion and from such assurances Waters [2] and his collaborators of the University of Wisconsin have gone on to use cyclopropane as an anæsthetic in surgery. They have found that in much lower concentrations it is equal in efficiency to other gaseous anæsthetics, that an excess of oxygen may be administered with this potent anæsthetic, that surgical anæsthesia can be produced in three to five minutes, that laryngeal reflexes are abolished more quickly than with ether, that it causes relaxation comparable with that of ether, that the blood pressure and pulse and respiratory rates are not altered to any appreciable extent, that recovery takes place in less than five minutes, and that the after-effects are very slight. With so much to go on, it seemed safe to use cyclopropane in obstetrics (just as divinyl oxide (vinesthene) [3] has been satisfactorily employed in this clinic during the past year).

In the series of cases herein reported, cyclopropane* was administered through a simple machine devised especially for the use of vinyl oxide in obstetrics and made by the Foregger Company of New York. The principal feature of this machine is a closed system containing alkali for the removal of carbon dioxide from the expired air so that the same anæsthetic may be breathed over and over again, thus making it very economical to use this rather expensive gas. Intermittent analgesia was produced as indicated for the more severe labour pains, and anæsthesia was maintained for the delivery procedures.

The facts of the first administrations of cyclopropane to parturient women are set out in the accompanying Table. This list shows considerable variety in the conditions of the patients as well as in the procedures of delivery. Satisfactory analgesia was easily produced when very small quantities of cyclopropane were inhaled with oxygen. Although none of the times of analgesia was long, I think it would be quite safe to relieve the pains with cyclopropane much earlier in labour than has been done, for the reasons that the uterine contractions have not been inhibited and that so much oxygen was used. We all know that it is good to administer oxygen intermittently—good for the mother and good for the fœtus, especially should the heart of the latter be weak. The use of oxygen in obstetrics is very important. During anæsthesia any required degree of muscular relaxation could be obtained without evident harm, and recovery was devoid of untoward effect to mother or child.

The bromsulphalein dye test [4] for liver function was carried out in three normal cases and in one of eclampsia. Practically no dye was retained in the blood of the normal women when the test was applied about twenty-four hours after the administration of cyclopropane, and as the liver of the eclamptic woman was damaged to an extent of more than 55 per cent. before delivery the damage was not enhanced by cyclopropane, there being less than 50 per cent. dye retention in her blood twenty-two hours after anæsthesia. Corroboration of the effects of cyclopropane on hepatic function has been obtained from experiments on dogs in the department of pharmacology of McGill University. It was found that cyclopropane administered over relatively long periods of time causes practically no impairment of liver function in normal dogs and no additional damage to those previously poisoned with chloroform.[5] It may be pointed out that this feature is equally favourable for cyclopropane and for vinyl oxide [3] when compared with chloroform.[6] It is apposite to mention that any measure of the action of a drug on the liver may be taken as good evidence of what is going on concurrently in other organs, indeed in the rest of the body.

From this inchoative study I may say that cyclopropane seems to be very suitable for the relief of pain in obstetrics, for the following reasons: (1) An abundance of oxygen is given with the cyclopropane. (2) Circulation and respiration are not depressed. (3) Anæsthesia is produced without appreciable metabolic disturbance. (4) Liver function is not impaired. (5) Anæsthesia is quickly and agreeably induced, satisfactorily maintained at any desired depth with ready flexibility and with minimal danger to the mother and child, and recovered from easily and uneventfully.

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* The cyclopropane was obtained through the generosity of Prof. H. E. Reilley, of the Department of Physics, McGill University.

Cyclopropane Anæsthesia in Obstetrics

No.	Age.	Pregnancy No. and condition.	Time in minutes. Analg.	Anæs.	Total.	Delivery procedure.
1	33	IX. Normal.	..	20	20	Rupture of membranes.
2	19	I. „	28	32	60	Sp. ep.*
3	19	I. „	25	40	65	„
4	26	II. „	20	12	32	„
5	23	I. „	40	47	87	Low-forceps, ep.
6	25	I. „	15	20	35	Sp. ep.
7	26	I. Flat pelvis.	..	46	46	Low Cæsarean section.
8	25	I. Toxic; B.P. 150/100; albuminuria + +.	35	27	62	Mid-forceps, ep.
9	22	I. Old poliomyelitis. Face to pubis.	..	60	60	Ditto, repair of complete tear.
10	26	I. Flat pelvis.	..	62	62	Low Cæsarean section.†
11	44	I. Uterine fibroids.	..	59	59	Classical Cæsarean section, sterilisation.*
12	17	I. Toxic; B.P. 140/100; albuminuria +.	25	35	60	Sp. ep.
13	28	I. Coccygeal deformity.	..	48	48	Low Cæsarean section.
14	18	I. Eclampsia; two seizures; four days in hosp. Bag induction. B.P. 160/118; albuminuria + +.	..	41	41	Sp. delivery of deadborn. (Uneventful recovery.)
15	35	III. Normal.	20	25	45	Sp. ep.
16	27	I. „	48	19	67	Mid-forceps. ep.
17	25	II. „	..	31	31	Sp. ep.
18	26	I. Breech presentation.	23	21	44	Extraction, ep.
19	25	I. „	..	37	37	„
20	24	I. Generally contracted pelvis.	..	51	51	Low Cæsarean section.†
21	23	I. Normal.	4	31	35	Sp. ep.
22	33	II. „	..	17	17	Spontaneous.
23	25	III. „	..	20	20	Sp. ep.
24	40	II. „	5	19	24	„
25	20	II. Brow presentation.	40	21	61	Mid-forceps, Scanzoni with ep.
26	21	I. Normal.	8	22	30	Sp. ep.
27	22	I. „	5	21	26	„
28	20	I. Retained placenta.	..	18	18	Removal and packing.*
29	23	I. Normal.	47	25	72	Sp. ep.
30	28	I. „	34	23	57	Sp. repair of small tear.
31	22	I. „	..	22	22	Sp. ep.
32	25	I. „	36	20	56	„
33	21	I. „	..	32	32	„
34	19	I. „	4	19	23	Sp. repair of small tear.

* Vomited once. † Vaginal preparation under anæsthetic. Sp. ep. = Spontaneous episiotomy.

Cyclopropane was the only anæsthetic used in every case. All section cases had atropine gr. 1/150 half an hour before operation. There was no other pre-anæsthetic medication in any instance.

I desire to thank Dr. D. W. Sparling, assistant resident of the hospital, for his valuable aid.

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Clinical and Laboratory Notes

A CASE OF PARATYPHOID A FEVER IN BRISTOL

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WITH the possible exception of a few cases in travellers returning from abroad paratyphoid A fever can hardly be said to have existed in England since the war. It may therefore be of interest to record the case of an adolescent who contracted it at home without having travelled or associated with travellers. Moreover there is some instruction to be drawn from the serological data on which the diagnosis was based.

Previous History.—A youth, 16 years of age, lived in an orphanage at Bristol, until two years ago, when he went to live with his brother in London. On Dec. 12th, 1933, he was admitted to the Central Middlesex County Hospital suffering from tinea cruris and follicular tonsillitis which both cleared up under suitable treatment. On Jan. 27th, 1934, in accord with regulations, he was sent to a hospital in the area of his previous location, viz., Southmead, Bristol, and came under the care of Dr. P. Phillips. There were no cases of typhoid or paratyphoid fever in the hospital during the patient's stay there, and as far as is known the patient was never in contact with anyone who had been abroad. He had a long history of constipation and megacolon, but apparently had never previously had enteric fever and had never received T.A.B. vaccine.

Clinical History.—The illness began on Feb. 27th and the patient was later transferred to Ham Green Fever Hospital under Dr. B. A. Peters. The clinical features were typical of enteric fever (typhoid or paratyphoid). The onset was insidious with general malaise, dizziness, drowsiness, anorexia, and constipation. The temperature rose by "steps" to 104° F., the pulse was slow, the spleen was palpable (three finger-breadths below the costal margin), and scanty rose spots were observed on the abdomen. One unusual feature was observed, namely, that the spleen remained palpable until March 28th—ten days after the temperature had fallen to normal (March 18th). By the 26th the patient was fit to be out of bed, and recovery was uneventful.

AGGLUTINATION TESTS

Dates (onset Feb. 27th)	H Suspensions. T	A (R.F. 5)	B	O Suspensions. T (R.F. 9)	A (R.F. 2)	B (Aertrycke) (R.F. 6)
March 10th	O (at 25)	2500	O (at 25)	120	25	150
„ 23rd	O (at 25)	700	O (at 25)	150	25	300
May 4th	O (at 25)	10	O (at 25)	10	O (at 5)	30
„ 22nd	—	O (at 5)	—	O (at 5)	—	—

The figures represent the last dilution at which strong partial agglutination was found.

As the accompanying Table shows, the tests with (Oxford) H-suspensions of *Bact. typhosum* (T) and *Bact. paratyphosum* B (B) showed no flocculation throughout (though traces of granular clumping could be detected in the typhoid suspension up to 1 in 50 in the first test), whereas *Bact. paratyphosum* A (A) showed an initially high titre which gradually fell to nothing during the following eight weeks. The O reactions will be discussed below.

Bacteriological Examination.—Repeated tests of stools and urine failed to reveal any organisms of the typhoid-paratyphoid group. No blood culture was done, an omission which is explained rather than excused by its being habitual in this country. We should like to register a plea for the routine practice of this procedure in all cases of suspected enteric fever.

The fluctuation of the paratyphoid A H-agglutinin during the course of the illness is exactly what one would expect in an acute enteric fever, when the first test is done in the middle of the second week—i.e., somewhere near the peak of the curve—and the second a fortnight later, when a rapid fall would be in progress. Neither previous infection nor inoculation could give rise to this phenomenon; nor is there any evidence that the patient had ever undergone either. According to the accepted canons of serology, the production of paratyphoid A flagellar (H) agglutinins in high concentration and a typically falling graph during convalescence can only be due to infection with *Bact. paratyphosum* A. With regard to the somatic (O) agglutinins, the low level of the paratyphoid A, and the more considerable height of the others are surprising, but we do not know enough about the serology of this infection to judge how abnormal this may be. We know that there is a somatic antigen common to the three organisms, in addition to the specific somatic component of each; and it may be that this—the former—is the more active in paratyphoid A fever.

The figures given in the Table for the O agglutinins on March 10th are probably too low, since the serum had been stored for more than a fortnight before testing, and we know that O agglutinins are less stable than H. The apparently delayed peak of the O curves is therefore probably unreal.

Our thanks are due to the physicians in charge of the case for their kind permission to publish it.

SUPPURATIVE OVARITIS FOLLOWING MUMPS

By J. B. McKinney, M.B. Belf.

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AND

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We have found no record of ovaritis as a complication of mumps published since 1929, and no British record since 1925. The only report of ovaritis occurring in a mumps epidemic is that of Troitsky,[1] who found non-suppurative ovaritis in 13 out of 33 girls afflicted. The condition was regarded as, pathologically, a peri-oöphoritis. Recovery was the rule and no permanent change in menstrual function is described.

The literature was reviewed by Harlow Brooks in 1913[2] and in quoting the few cases on record he stated that none had been published between 1903 and 1913. He also called in question the diagnosis in a case reported by Meinhardt.[3] This is the only one of suppurative ovaritis following mumps that we can find in the literature, and Brooks's comment is as follows: "Inasmuch as this is the only instance reported in the literature in which metastatic pus formation took place in the ovary, although several instances in which suppuration has taken place in the male sexual gland are recorded, Meinhardt's case cannot be definitely accepted and the possibility of a concurrent appendicitis or salpingitis is suggested." It is therefore important to place on record the following case of suppurative ovaritis following mumps with operation later and recovery.

Mrs. A., aged 43, became ill on Feb. 7th, 1933, with sore-throat and difficulty in swallowing. Her two sons were at this time lying in the same room suffering from typical mumps. Her throat and tonsils were acutely inflamed. A whitish exudate covering the tonsils in parts was easily removed without causing bleeding. Temp., 99·6° F.; pulse-rate, 104. A swab from the tonsils proved negative to *B. diphtheriæ*. On Feb. 8th her morning temperature had risen to 100·2° and the pulse-rate to 106. Both parotid glands were now enlarged and markedly tender, but the submaxillary glands appeared normal. There was definite improvement in the condition of the tonsils. She now complained of headache and nausea, but did not vomit. In the evening the temperature was 103·6° and the pulse-rate 128. On Feb. 9th the morning temperature was 104·8° and the pulse-rate 142. While there was no change in the condition of the parotid glands, the pharynx and tonsils appeared normal. She now complained of severe pain in the epigastrium, and was vomiting frequently. Her tongue was dry and furred. The abdomen moved freely on respiration, without increasing the severity of the pain but there was definite tenderness in the epigastrium. There was no change in the pulse-rate and temperature at noon, but the pain was now referred to both iliac fossæ. The vomiting was replaced by almost continuous retching. The abdomen still moved freely on respiration, but there was marked tenderness low down in both iliac fossæ. There was no rigidity of the abdominal wall, nor was any mass palpable. Rectal examination was indefinite. The patient's condition was unchanged in the evening, save that the parotid swellings were somewhat diminished. (J. B. McK.)

On Feb. 10th the morning temperature was 104·6° and the pulse-rate 144. The abdominal pain was much worse, and retching almost continuous. She had now diarrhœa (one motion per hour), and the stools contained a fair amount of mucus. The tongue was dry and furred and the odour of the breath fœtid. There was no apparent swelling of the parotid glands, but some tenderness yet remained. The abdominal findings were as before, but on rectal examination there was marked tenderness on both sides of the pelvis. Ovaritis was diagnosed. (H. H. S.)

On Feb. 11th the temperature was 99·6° and the pulse-rate 124. Abdominal findings remained unchanged; the retching had yielded to the administration of atropine. In the evening the temperature was 103·6° and the pulse-rate 136. On vaginal examination there was a fair amount of bleeding from the uterus. There was exquisite tenderness in all fornices and the uterus appeared to be retroverted and of normal size with some diminution in mobility. The last menstrual period had finished on Feb. 3rd.

On Feb. 12th the morning temperature was 99·6° and the pulse-rate 92. A mass was palpable in the left iliac fossa. The evening temperature did not change, while the pulse-rate rose to 100. From Feb. 13th–15th the temperature remained normal and the pulse-rate ranged from 76 to 86. While the patient had no symptoms, the mass in the left iliac fossa remained unchanged. Feb. 16th: morning, temp. 99°, pulse-rate 78; evening, temp. 99·8°, pulse-rate 80. Feb. 17th: morning, temp. 99·6°, pulse-rate 80; evening, temp. 104·4°, pulse-rate 96. The temperature then fell to normal and remained so till Feb. 24th, when it suddenly rose to 101·8°. There had been no change in her condition in the intervening period. Coincident with this rise of temperature on the 24th the patient complained of severe pain in the left iliac fossa and began to vomit. The mass was now remarkably tender and nothing could be made out on vaginal examination except that it appeared to be distinct from the uterus, and very tender. It reached almost half-way to the umbilicus.

Under chloroform and ether anæsthesia the abdomen was opened by a midline subumbilical incision by H. I. McC. Pus welled into the wound. The pelvic cavity was closed off by adhesions and omentum. The appendix was lying behind the terminal ileum and was normal. On further examination of the pelvis a considerable quantity of odourless pus was cleared away. Both Fallopian tubes were of normal size and appearance, save for a few adhesions to the bowel. The left ovary was almost entirely necrotic and for the most part had disappeared. What remained was intensely engorged, soft, and on pressure collapsed between the fingers exuding pus. The right ovary was also the seat of a necrotic process but not to such a marked degree as the left. It was a little enlarged and on section was the seat of multiple abscesses, varying in size from a pinhead to that of a pea. The general abscess cavity was cleared out, and the necrotic ovarian tissue removed; it was possible to conserve about one-sixth of the right ovary. The pelvic cavity was drained through the abdominal wound. The retroverted position of the uterus was considered to be a barrier to drainage of the pouch of Douglas through the posterior fornix. Convalescence from the next day onwards was uneventful, and the patient left hospital three weeks later with the abdominal wound completely healed. Nothing was felt on vaginal examination except some thickening in both lateral fornices and complete immobility of the uterus. (H. I. McC.)

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[1] Vratch, 1902, No. 15.

[2] Jour. Amer. Med. Assoc., 1913, lx., 359.

[3] Beobachtungen über Parotitis. Med. Zeitung. Russlands, 1853, x., 265.

This patient has remained well since her illness, and menstruation has retained its normal characters.

Belfast.

MEDICAL SOCIETIES

ASSOCIATION OF CLINICAL PATHOLOGISTS

The summer meeting of this association was held at the Royal Infirmary, Gloucester, on June 23rd. Dr. E. N. DAVEY, pathologist to the hospital, occupied the chair. The proceedings were largely devoted to a consideration of the

Clinical Pathology of Coma

Dr. G. ROCHE LYNCH (London) spoke of the

TOXICOLOGY OF THE BARBITURATE GROUP OF DRUGS

He pointed out that all drugs of this group have the common basis of a combination of malonic acid with urea, the different proprietary preparations being produced by the substitution of various radicles at varying points; some of these preparations in addition to the malonyl-ureide compound also contained various proportions of amidopyrin or pyramidon. A single pharmacological dose produced sleep; repeated doses might in sensitive persons give rise to such symptoms as drowsiness, ataxic gait, ptosis, diplopia, and visual hallucinations. The barbiturates were not cumulative in the ordinary sense of the word, but after prolonged exhibition the effects might be slow in disappearing; the margin between the effective and the toxic dose was small; after a toxic dose symptoms might appear in a few minutes; these were headache, ataxia, vertigo, and drowsiness passing on in to coma; there might be a preliminary period of excitement. On the establishment of coma the plantar reflex might become Babinski in type and the breathing periodic, the pupils were small but not pin point, and the temperature became subnormal; broncho-pneumonia tended to appear after the first 24 hours of coma. The speaker pointed out that many persons showed an idiosyncrasy to the barbiturates and uttered a warning for their use with caution in toxic conditions of the liver, hyperthyroidism, chronic sepsis, renal disorders, and in all states of allergy.

There was considerable variation between the minimum and the average fatal dose. Post-mortem findings were not characteristic; broncho-pneumonia was almost constant but this was of no special type; the liver and kidneys showed fatty and parenchymatous change, but this might be only evident on microscopic examination. It had been pointed out to the speaker by Dr. W. D. Newcomb that the cerebellum frequently showed a pressure cone. Pemphigoid and bullous rashes might appear on the skin.

He questioned whether in all cases returned as suicide from barbiturate poisoning the drug had actually been taken with fatal intent. He recorded one instance in which ten tablets of a barbiturate preparation were taken during one night; on recovering consciousness the patient recollected having taken two only; the remaining eight had apparently been taken in a state of somnambulism induced by the drug. He recommended that in cases where patients are given more than sufficient tablets for one night they be instructed to take the night's dose and then to place the remainder in an inaccessible spot.

In the treatment of barbiturate poisoning Dr. Roche Lynch advocated washing out the stomach; for this purpose alkali should on no account be used as this rendered the poison more soluble; strong coffee and glucose should be left in the stomach and the washout repeated two or three times at intervals of four hours or so. Colonic lavage was useful and should be repeated after 12 hours. Cardiac stimulants should be exhibited in full doses. Lumbar or cisternal puncture was of the utmost importance and should be repeated every 12 to 15 hours so long as the case seemed to demand it. This procedure served both to remove the poison which was excreted in high percentage into the cerebro-spinal fluid and also to relieve cerebral pressure. Other methods of treatment were by strychnine, picrotoxine, and alcohol. Great claims had been made for treatment with strychnine and massive doses had been given. Dr. Roche Lynch, although regarding strychnine as valuable, urged reasonable caution in its use.

In identifying a case of barbiturate poisoning the urine, stomach contents, and cerebro-spinal fluid should be examined for the poison; examination of the cerebro-spinal fluid was of particular importance as drainage should be persisted with until the drug had practically disappeared. The speaker described the methods of identification of the drug in the various body fluids and pointed out that the barbiturates fell into two groups, one of which was rapidly broken down while the other was more stable. Dial belonged to the former group and the amount of this excreted in the urine might be very small.

Dr. J. G. GREENFIELD (London) reported finding excess of protein in the cerebro-spinal fluid; in view of the evidence that cerebral œdema with increase of cerebral pressure played some part in the production of symptoms he queried the safety of cisternal puncture.

Dr. GREENFIELD reported several cases of

SUBDURAL HÆMATOMA

He stated that this condition appears to be becoming more frequent, probably on account of the increase in motor accidents. Its occurrence was much commoner in males than in females. He pointed out that the cerebro-spinal fluid might be absolutely normal and not even under pressure; sometimes it showed slight discoloration of the supernatant fluid after centrifugalisation and an increase of protein, but these features were not constant. Flakes of fibrin might be present in the fluid as withdrawn; their presence constituted an important diagnostic aid. Dr. Greenfield thought it was difficult to account for the long latent period between injury and the onset of pressure symptoms on the assumption of actual continuance of the hæmorrhage. The increased cerebral pressure might be brought about by imbibition of fluid into the hæmatoma, this being occasioned by increase in the osmotic tension of the hæmatoma contents due to breakdown of the blood.

Dr. A. G. SHERA (Eastbourne) described several cases of

COMA DUE TO SUBARACHNOID HÆMORRHAGE

He drew attention to the existence of a spinal as well as a cerebral form; the former never produced coma and was only mentioned for the sake of completeness; in the spinal form the main symptom was severe pain in the back relieved by lumbar puncture. In both the spinal and the cerebral forms the cerebro-spinal fluid was almost invariably blood-stained, the blood was intimately and uniformly mixed with the fluid, and on centrifugalisation the supernatant fluid was coloured to a degree depending on the distance of the date of the hæmorrhage. Besides giving relief to the headache, lumbar puncture was an important diagnostic measure; the condition was usually accompanied by some degree of fever and, short of examination of the cerebro-spinal fluid, the diagnosis between it and meningitis might be impossible. Massive albuminuria might occur and papillœdema and retinal hæmorrhages were common.

Dr. GREENFIELD showed microphotographs demonstrating deficiency of the media of the cerebral vessels to be common at points of bifurcation; it was at these deficient sites that the aneurysms whose rupture gave rise to subarachnoid bleeding were formed.

Dr. F. B. SMITH (Preston) spoke of

DIABETIC COMA

He stressed the importance of the examination of the urine for sugar and acetone in this condition, but attached little importance to the estimation of the blood-sugar. He pointed out that in certain cases uræmia and diabetic coma might occur together; it was important therefore to know the blood-urea level. In treatment he considered that the administration of glucose as a means of combating ketosis should play a prime part; the level of the blood-sugar induced by this glucose feeding he considered to be more or less immaterial and frequent examinations of the blood-sugar were not necessary in the treatment of diabetic coma.

Dr. S. C. DYKE (Wolverhampton) stated that some degree of urea retention was common in diabetic coma and might reach a high degree; he cited one case in which it had reached 350 mg. per cent.; the patient recovered. He considered that it was important in the treatment of diabetic coma to bring the blood-sugar level down to reasonable limits, otherwise the tendency to tissue water depletion was not combated. He advocated the administration of saline rectally, intraperitoneally, and subcutaneously in preference to intravenously.

Dr. L. JANES (Brighton) pointed out that the unlimited introduction of saline into the system might serve to upset the mineral balance of the organism; he suggested that Ringer's solution was a preferable form in which to administer fluid.

Dr. A. RENSHAW (Manchester) asked why, since there was plenty of available sugar in the blood in diabetic coma, it was necessary to give sugar by the mouth.

HYPERTENSIVE ENCEPHALOPATHY

Dr. S. C. DYKE reported seven cases illustrating the occurrence of coma, and in some cases convulsions and other grave cerebral manifestations in association with raised blood pressure. He used the term "hypertensive encephalopathy," first employed by Oppenheimer and Fishberg, to describe the condition. Five of the patients referred to were children or young adults; in addition to coma all these showed convulsions and some of them amaurosis; two patients were elderly, convulsions were absent in these cases. All the younger patients were suffering from acute glomerulonephritis; evidence of renal damage was absent in the elderly subjects. The common feature to all was a raised blood pressure. The speaker pointed out that when occurring along with evidence of renal damage this condition is usually described as "uræmia"; in none of the cases observed, however, was the blood-urea significantly raised, and the term was not therefore applicable. Treatment was by venesection, lumbar puncture, and magnesium sulphate rectally and by mouth, and all cases made a good recovery.

Dr. CUTHBERT DUKES (London) considered that all the cases described were of nephritis and that the manifestations might properly be called "uræmia."

Dr. A. F. S. SLADDEN (Swansea) considered that in the light of present knowledge some examination into the meaning of the term "uræmia" was advisable.

Dr. P. C. HOU (Cheeloo) described a case of

Monocytic Leukæmia

The patient in the course of a short illness during which non-hæmolytic streptococci were isolated from the blood stream showed a white cell count of over 200,000 per c.mm., the increase in the cell count being due to mononuclear cells. By supravital staining these cells gave the appearance of being monocytes. After death nearly all organs showed infiltration with cells of this type. On warm stage preparations of the blood the cells were non-motile.

Dr. E. N. DAVEY (Gloucester) demonstrated specimens from a case of Addison's Disease unsuccessfully treated with Eucortone. At post-mortem examination extensive tuberculous disease of both adrenals was found. An exacerbation of an old tuberculous lesion of the lung waked into activity in the course of the treatment.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

THIS society met at Newcastle-on-Tyne on June 8th, when Mr. FRANK STABLER read a communication on

Blood Reinfusion in Hæmoperitoneum associated with Ruptured Ectopic Gestation

He had performed auto-transfusion in 14 cases of hæmoperitoneum during the last three years; in 13 cases the bleeding was due to acute rupture of a tubal pregnancy, and in 1 it was from a ruptured vein on the surface of a pedunculated subperitoneal fibroid. His technique was as follows:—

> Immediately after arresting hæmorrhage he baled the fluid blood out of the abdomen with a coffee cup into a pint glass measure, containing one ounce of 2 per cent. sodium citrate solution, and covered with six to eight thicknesses of muslin gauze soaked in citrate. The whole was kept in a basin of water at 100° F., and one ounce of citrate solution was added as the blood was baled in. If there was any difficulty in securing enough blood, the table was lowered from the Trendelenburg position. The reinfusion was done immediately after the abdomen was

closed. He used the most suitable vein at the bend of the elbow, making a diagonal incision, and tying in a cannula, and ran in the blood at a rate not faster than one pint in one hour.

Mr. Stabler quoted several typical cases: one had a blood pressure of 54/38 on admission, ten hours after rupture, the temperature being 96° F. and the pulse 132, impalpable at the wrist. When the abdomen was closed the blood pressure was 65/40. During transfusion it went up gradually and at the end of transfusion it was 115/63 with a pulse-rate of 132. It was common for blood pressure to rise 20 to 30 mm., red cell count to rise by 1½ to 2 millions, and hæmoglobin to rise 20 points. Control cases showed that blood pressure did not rise as a result of anæsthesia, the Trendelenburg position, or hæmostasis alone; in fact, where transfusion was not done there was a fall in blood pressure for two hours of about 10 points, so that transfusion actually produced a gain of 30 to 40 mm. blood pressure. Regarding the possibility of introducing infection with the blood, Mr. Stabler thought that the blood stream was the safest place to put organisms other than hæmolytic streptococci, and if those organisms were present in the abdominal blood the end-result would probably be the same whether they were injected into the blood stream or not. However, blood in the peritoneal cavity often became infected after about 48 hours, and therefore reinfusion was always avoided if the acute rupture had occurred more than 24 hours before operation or if there was fever. Multiple pulmonary embolism from rouleaux of corpuscles or small clots were possible; in this connexion Mr. Stabler regarded the rate of injection as important. One patient died 42 hours after operation, but death was not attributable to the reinfusion. Since the pathologist's report on the autopsy was: "Button-hole mitral stenosis; lungs show chronic venous congestion and three small patches of bronchopneumonic consolidation; microscopically they do not show any evidence of embolic blocking."

Mr. HARVEY EVERS read a communication on the

Lower Segment Cæsarean Section

detailing his experience in 150 cases. The results were as follows:—

—	Mothers died.	Babies.		Morbidity.
		Stillborn.	Died.	
Whole series (150)	4	5	6	29
Cases operated on before labour (27)..	0	1	0	2
Suspect or septic cases (123) ..	4	4	6	27
Failed forceps cases (24)..	3	2	3	14
Suspect cases, excluding failed forceps (99)	1	—	—	13

The results were very satisfactory as a whole. The figures for suspect cases were extremely good considering that many of the cases would have been regarded by some obstetricians as unfit for Cæsarean section. The failed forceps group, as might be expected, gave the worst results, but in view of the serious condition of several of the patients he thought them reasonably good. 75 per cent. of the maternal and nearly 50 per cent. of the fœtal mortality occurred in this group, and the morbidity was high. It would be difficult to produce a parallel series of cases treated by the classical method with such satisfactory results.

The following were the four fatal cases:—

CASE 23.—Failed forceps; died of general peritonitis on the fifth day. It would have been better to drain this case.

CASE 58.—Emergency. Prolonged labour; membranes ruptured 12¼ hours; died of broncho-pneumonia on the 31st day.

CASE 73.—Failed forceps; retained placenta, removed manually after operation; died of broncho-pneumonia on the 36th day.

CASE 84.—Failed forceps; much damage to soft parts; died of broncho-pneumonia on the 7th day.

Indications.—The great majority were cases of contracted pelvis. In some the operation was done after trial labour, and the basic factor at fault was poor uterine action rather than disproportion. It was in these cases that the lower segment approach had special advantages over the classical method; it reduced the number of inductions of labour. In 5 cases there was a placenta prævia, but in only 3 of them was it the real indication for operation; there was troublesome hæmorrhage, and Mr. Evers was not impressed with this means of access for this type of case. Fibroids were present in 4 cases, but only provided the indication for interference in 1; the fibroid was posterior, and though it obstructed labour it did not interfere with the approach to the lower segment. There were several cases of breech presentation, several elderly primiparæ, and 1 of sacro-coccygeal tumour. In 3 cases the operation followed induction of labour which had failed; 1 of them showed severe morbidity. In 1 case the cord was 100 in. long and was round the neck nine times.

Technique.—Mr. Evers agreed with Mr. Stabler that a douche followed by antiseptic treatment of the vagina and cervix was sound practice, though he had only had this carried out on rare occasions.

Anæsthesia had usually been general, never local; spinal anæsthesia was used twice. The patient was horizontal, a slight Trendelenburg position was used in the early cases, but it was not essential and encouraged flow of septic matter from the vagina into the uterus. The incision used was the ordinary low vertical subumbilical transperitoneal incision; on two occasions when the extraperitoneal route was used it was unsatisfactory. It was important that the bladder should be quite empty. The peritoneal cavity was packed off by gauze. The peritoneum of the utero-vesical pouch was incised transversely and the bladder pushed down. This was only liable to be difficult in repeat cases. In 16 of the early cases a transverse uterine incision was used; it had, however, no advantage in delivering the head, bleeding was more severe, and it was difficult to prevent tearing into the blood-vessels at the sides. A vertical incision was now used; the uterus should be pushed into the middle line first, and any torsion present undone; an accurately median vertical incision minimised hæmorrhage. It should begin as low as possible, and should be extended upwards by scissors. Extension downwards of the incision during delivery might wound the bladder, and extension or tearing up into the upper segment increased bleeding and weakened the scar. The membranes were preserved while the incision was made; then 1 c.cm. of pituitary extract was injected into the uterine muscle. Bleeding from the cut edges was controlled by catch forceps or by special forceps designed by Mr. Evers.

The head was delivered by lifting the caput and moulded part of the head up into the wound; then pressure was exerted on the fundus, the head being kept fully flexed. The previous injection of pituitary was a great help. In difficulty, one or both blades of a pair of short forceps were used. This was often necessary in cases not in labour, or when the head was floating. One blade was used in 20 cases, two blades in 10 cases, and the feet were extracted first in 8 cases of deliberate version or of breech presentation.

Delivery of placenta and membranes.—In 15 of his early cases Mr. Evers delivered the placenta per vias naturales at the end of the operation. Case 73, in which the retained placenta had to be manually removed, induced him to discard the method. This was a failed forceps case, and the manual removal might have contributed to the fatal result. Since then he had always waited for the placenta to separate, and in many cases it was expelled into the lower segment and could be removed by roping the membranes. In a few the hand must be passed into the upper segment to remove it, but this should be avoided if possible. The uterus was closed by two layers of sutures and the peritoneum by continuous catgut. There was complete lack of tension, apposition was excellent, and healing sound. In suspect and failed forceps cases, a piece of tissue drain was split at one end; one portion drained the uterine wound, and the other the utero-vesical pouch. It should not be removed too soon.

Repeat cases.—There were 39, of which 29 had had classical and 10 lower segment operations; of the 29, 3 had had two previous operations and 1 had had three; of the 10, all had had only one previous operation. In one lower segment case the upper segment had been encroached on and the scar was thin at that point; in the others there was no sign of scar. In patients becoming pregnant again (49 cases after the lower segment operation, there has been no case of ruptured scar. Some had had normal delivery at full term, many have had induction, and many have had repeat operations.

Mr. Evers summarised the advantages of the operation as follows: (1) Trial labour can be made with much less risk. This diminishes the number of Cæsarean sections and inductions. (2) The danger of sepsis is much less and if it occurs it is likely to be pelvic and not general. (3) There is a definitely lower maternal mortality in suspect and failed forceps cases. (4) The operation, though technically more difficult, is accompanied by much less hæmorrhage. (5) The convalescence of the patient is considerably less stormy. (6) The risk of subsequent rupture of the scar appears very slight. The only disadvantage of the operation is that it is admittedly sometimes difficult to do in cases not in labour.

Dr. FARQUHAR MURRAY read a communication on

The Value of Lipiodol and X Rays

in the diagnosis and treatment of pelvic mischief. The technique adopted consists of injecting 8 c.cm. of slightly warmed lipiodol by means of the screw syringe provided by Messrs. Bengué. The patient was under anæsthesia and the vagina and cervix had been swabbed with acriflavine. The cervix was not dilated but was clamped to the cannula by a volsellum. The patient was sent to the X ray department with the volsellum still clamping the cervix, and a second photograph, which was essential for correct interpretation, was taken in 24 hours. In a normal case the shadow of the uterine cavity, attenuated threads representing the tubes, and a mass, usually well defined, near the ostia, were visible. In 24 hours the uterine and tubal shadows had disappeared and there was merely diffuse blurring. The presence of vaginal shadow and clinical observation indicated that drainage in these cases was both per abdomen and per vaginam. Normal tubes were distensible and also contractile, and this was a disadvantage when neo-hydriol, a preparation thinner than lipiodol was used, as far as the shadows were concerned. Dr. Farquhar Murray discussed the interpretation of tubal and terminal shadows, which were of great importance. With regard to sterility lipiodol provided a method of obtaining information which prevented purely speculative and often futile operations.

> There were three main types of case. In the first the uterus was shown up in the photograph, but not the tubes. Operation was not advised here, as the state of the tubes was unknown and a plastic operation at the cornua produced results too speculative to be justified. In the second type, the solution distended the tubes to the abdominal ostium, which was sealed. Terminal blobs of solution were observed in 24 hours. This showed patency and normality of the tube as far as the ostium and salpingostomy was indicated. In the third type the solution passed to the abdominal ostium merely as a fine thread; in 24 hours there were only two small dots corresponding to the ends of the tubes. This, in Dr. Murray's opinion, probably means fibrosis of the tube; the result of salpingostomy in such a case was very doubtful.

Sometimes lipiodol with an X ray revealed an error in the insufflation test.

In cases of pelvic pain where examination was negative and diagnosis rests between urinary and tubal infection, Dr. Murray, with the idea of avoiding operation if possible, proceeds as follows:—

> The general condition and urinary tract were treated for two months, citrates, bromides, and aperients figuring prominently in the régime. If this did not cure, injection of lipiodol and X ray examination was done. Laparotomy was advised if the solution did not enter the tubes. If it entered the tubes but did not escape into the abdomen, or if it passed into the abdomen freely with normal photographs, further symptomatic treatment was recommended.

If the shadows appeared normal, one would be reasonably certain that the tubes were at fault if the patient admitted that the injection made the pain worse, and by the indirect evidence that in some cases the pain had been ultimately relieved. If a definite lesion is proved to exist operation was not done, because the damage could not be gross or it would have been palpable. If the solution reached the ends of the tubes, though it failed to reach the abdomen, the existence of tubal drainage was proved and this justified optimism. If the pain remained after a further two months' treatment, operation was justified.

In cases of chronic cervicitis and vaginitis which required radical disinfection, it had been his rule to inject lipiodol and have the cases X rayed. Definite proof of tubal disease was sometimes found even if there was no pain. Lipiodol and X ray examination gave useful information in cases [illegible] in young women not only abou[illegible] dage, but also about the one which it was hoped to conserve. This may mean intelligent instead of speculative treatment at laparotomy.

Cases were described by Dr. FARQUHAR MURRAY and Mr. HARVEY EVERS.

WOOLWICH WAR MEMORIAL HOSPITAL.—This hospital, opened six years ago with 112 beds, is already so seriously inadequate that an appeal is being made for £50,000 for enlargements. There is a waiting-list of 202, and the bed accommodation is exceeded. In consequence of extensive building the population is definitely growing and the position is officially described as a "terrible problem." The allocation of the wards is unsatisfactory, and since there is only one ward for men it has become the invariable practice to admit urgent cases to the children's ward. There is a maternity ward for eight mothers, but on one occasion in the past year 15 mothers and 14 babies were being nursed. The housing of the nursing staff "causes considerable concern" and the radiological departments are proving too small for requirements. The weekly cost per patient last year was £3 9*s.* 6*d.*

REVIEWS AND NOTICES OF BOOKS

1. Nephritis and Allied Diseases

Their Pathogeny and Treatment. By ROBERT PLATT, M.D. Sheff., M.R.C.P. Lond., Physician, Royal Infirmary, Sheffield; Visiting Physician, Montagu Hospital, Mexborough. London: Humphrey Milford, Oxford University Press. 1934. Pp. 166. 7*s.* 6*d.*

2. Hypertension and Nephritis

Third edition. By A. M. FISHBERG, M.D., Associate Physician to Beth Israel Hospital; Associate in Medicine, Mount Sinai Hospital, New York City. London: Baillière, Tindall and Cox. 1934. Pp. 668. 32*s.* 6*d.*

1. Dr. Platt has succeeded in less than 200 pages in presenting a clear and readable account of the main features of nephritis. Beginning with a chapter describing the anatomy and physiology of the kidney, in which his views are largely based on those of Cushny and Verney, he proceeds to describe the main changes in renal function occurring in disease. His discussion of the relative importance of such factors as the diminution of the serum protein and salt-retention in the production of œdema is lucid and well reasoned, and the third chapter which deals with tests of renal function is particularly valuable in that the tests given are fully up to date and prolixity is avoided. In later chapters Dr. Platt illustrates various types of disease by examples from his own experience. It is perhaps unfortunate that he should not have separated the various types of disease which are usually included in the term "eclampsia," and it is perhaps possible at the present day to discuss the treatment of that condition with rather greater assurance than the author feels to be justified. Essential hypertension is disposed of in a chapter of nine pages and brevity has perhaps been carried too far, for the less instructed reader may fail to recognise the importance of many features of the disease described. The occurrence of papillœdema is, for example, not mentioned, and throughout the book the description of various ocular manifestations in nephritic and hypertensive states might be amended. In spite of these small defects, few, if any, better books on this subject are available at the present time.

2. For the earnest student, eager to get clear knowledge concerning diseases of the kidneys, the appearance of the third edition of Dr. Fishberg's book provides a great opportunity. To the physician versed in this branch of medicine it is an event. Considerable additions and alterations have been made. The subjects of extrarenal nitrogen retention, hypochloræmia, and albuminuria due to cerebral lesions are amongst the more important additions, whilst those interested in therapeutics will find the use of salyrgan, magnesium sulphate, and acacia fully discussed.

The last edition of Dr. Fishberg's book appeared in 1931. The present volume is larger by over 50 pages, and it may perhaps be asked whether the author will not next produce a magnum opus in several volumes together with a short handbook more suitable to the purse and desires of the student. Whether he does so or not the existing form of his book is unquestionably a very fine presentation of the subject. Every chapter is admirably documented with references, neither the ancient nor the latest investigators escape the eye of the writer; at the same time Dr. Fishberg never loses sight of the fact that nephritis and hypertension are diseases which must remain in the care of the general practitioner, that laboratory facilities on an extensive scale are not always available, and that the practical outlook is essential.

The book is one which should be read and re-read by student, physician, and pathologist.

Moderne Therapie der Neurosyphilis

By BERNHARD DATTNER, Dr. Med. et Jur., Vienna. Vienna: Wilhelm Maudrich. Pp. 334. RM.22.

THAT a monograph of over 300 pages should be required for a full examination and discussion of present-day methods of treating neurosyphilis is surely a striking commentary on their unsatisfactory nature. Were treatment as specific as the treponeme appears to be there would be one method, and one alone, just as typhoid fever and diphtheria can be successfully and specifically combated. But the existence of therapeutic variety and diversity can only mean that no one procedure is reliably curative. Dr. Dattner's review covers the whole field of general paralysis in convenient fashion; he makes six classes of technique—viz., treatment by (1) infective disease, (2) avirulent material, (3) unspecific chemical substances, (4) new specific medicaments, (5) physico-chemical methods, and (6) sunray and personal blood injections. Each is discussed critically, weighed in the balance, annotated, and summarised. For tabes a similar line is followed, but there is more to be said of symptomatic treatment here, as perhaps is natural. The treatment of cerebro-spinal syphilis is also described.

On the whole, we consider that the usefulness of tryparsamide is under-estimated by the author, and the value of malaria and recurrent fever technique rather overstressed. None the less no one can fail to note how much the burden of treatment has been lightened by methods in vogue to-day, and how general is a feeling of hopefulness. The book is enriched by numerous tables and illustrations, and provides also a summary of lumbar puncture procedures and tests.

External Diseases of the Eye

By DONALD T. ATKINSON, M.D., Consulting Surgeon to the Santa Rosa Infirmary and the Nix Hospital, San Antonio, Texas. London: Henry Kimpton. 1934. Pp. 704. With 479 engravings. 35*s.*

THE details of external diseases in this book are profuse. About 150 pages are devoted to diseases of the eyelids alone; these include congenital anomalies, affection of the skin, fungus diseases, tumours and operations on the lids. For ptosis, five different operations are described, but there is no reference to operations which utilise the superior rectus muscle or to Hess's operation. Clinically we miss any warning of the danger to the cornea if inefficiently protected after any operation for ptosis. No less than 12 operations for ectropion are described and 10 for entropion, but not the simple operation of excising skin and muscle for spasmodic entropion of the lower lid. For lacrymal disease Meller's (misprinted "Müller") procedure for excision of the sac is described—not so fully as it deserves, and though

Toti's and West's operations are not referred to, the author advocates the temporary insertion of a rubber drainage-tube through an opening into the nose. The chapters on conjunctival and corneal diseases are on a similar scale, but so much space is devoted to rare conditions that the commoner ones are apt to get crowded out. Angular conjunctivitis, for instance, is only referred to in passing, and the specific effect of zinc sulphate on the Morax-Axenfeld bacillus is not mentioned. The bacteriology of the conjunctiva, which is of great practical importance, finds no place in this book.

Besides external diseases, properly so-called, there are chapters on the iris, ciliary body, lens, and on glaucoma. These subjects are not dealt with in the same detail as the rest, and there is no reference to fundus conditions, even in glaucoma. The usual operations are described and illustrated. The subject of refraction is outside the scope of the work. In the chapter on the eye muscles several operations are described, but no adequate treatment of concomitant squint is described and no reference to its orthoptic treatment.

On the whole the work is valuable, chiefly as containing accounts of a number of rare conditions such as yaws and leprosy and rare fungus diseases, which will with difficulty be found elsewhere. The numerous drawings in black and white are clear and useful, and so are the many photographs, taken not directly from a patient but from wax models. Four interesting drawings illustrate the results of optical iridectomies or iridotomies, in which the author succeeded in restoring useful vision to patients previously given up as blind.

Operative Gynecology

By Dr. H. V. PEHAM, Privy Councillor, Professor of Obstetrics and Gynecology; Chief of the I. Frauenklinik of the University Vienna; and Dr. J. AMREICH, Privatdozent for Obstetrics and Gynecology of the University, Vienna. With an introduction to the edition in English by GEORGE GELLHORN, M.D., Professor of Clinical Obstetrics and Gynecology, Washington University School of Medicine, St. Louis, Mo. Authorised translation made by L. KRAEER FERGUSON, M.D., Associate in Surgery, University of Pennsylvania. London: J. B. Lippincott Company. 1934. Two volumes. Pp. 779. 5 guineas.

WE agree with Prof. Gellhorn, who in his introduction, says that the authors deserve much credit for having made this monumental work accessible to the English-speaking public. The first volume deals with such matters as the design and management of the operating theatre, the nature of anæsthesia advised, and post-operative complications. The last eighty pages contain a detailed description of the relations in the pelvis, the blood-vessels, nerves, and lymphatics, and the ureters. In the second volume are descriptions of the actual operative procedures recommended. The authors have chosen to describe in detail one, or at most two, operations for the surgical cure of any condition. The treatment of cervical cancer receives keen attention, and the chapter devoted to it includes a quantity of carefully collected statistical data on the end-results that may be expected. For the cure of prolapse the orthodox repair of the pelvic floor is advised; vaginal hysterectomy is not considered in this connexion. For prolapse associated with urinary incontinence it is claimed that the best results are obtained by the interposition operation. Baldy's operation is recommended for the operative correction of a retroverted uterus, and vaginal operation for the repair of bladder fistulæ.

The production of the work deserves high praise. Almost all the illustrations, and they are extremely numerous, are original, and the artist, Karl Hajek, has faithfully reproduced the pictures familiar to those who have wide clinical and surgical experience, and the operative details are shown so clearly that the procedure is easy to follow. Paper, type, and arrangement are alike excellent. This work will appeal to all interested in gynæcological surgery, but it will be most appreciated by the young specialist. As Prof. Gellhorn remarks, so complete are the descriptions, so exhaustive is the recital of technical minutiæ, and so impressive are the pictures that the reader may well imagine himself present at the operation.

Diseases of the Spinal Cord

By WILLIAMS B. CADWALADER, M.D., Professor of Clinical Neurology, University of Pennsylvania Medical School. London: Baillière, Tindall and Cox. Pp. 204. 29s.

Dr. Cadwalader's unambitious and handy book on diseases of the spinal cord is intended for the student of medicine, neurologist, surgeon, and general practitioner; as such, it ought not to vie with more elaborate text-books on the one hand, or with mere vade-mecums on the other. A serious endeavour has been made to set down in concise and accurate fashion the cream of present-day lore in regard to the subject, so that no reader will be disappointed. This is a difficult matter, as Dr. Cadwalader is well aware; but he has discharged his task with considerable success. He gives us evidence of original investigation as well as of wide knowledge of the literature; his descriptions are compact and tidy, as befits his aim; the illustrations, clinical and pathological, are well chosen. There is little in the volume with which any will disagree; perhaps the author rather over-states his case in claiming that primary lateral sclerosis is "now accepted as a distinct entity"; and it is premature, surely, to hold that muscular dystrophy, Thomsen's disease, and certain other conditions here examined are dependent on disturbances of the sympathetic system.

Whither Medicine?

By JOSEF LOEBEL. Translated by L. M. SIEVEKING and I. MORROW. London: Sidgwick and Jackson. 1934. Pp. 296. 7s. 6d.

THE curious title of this book was no doubt chosen in the belief that a knowledge of the past is of interest only as a guide to the future, for in simple language it is a semi-popular history of medicine and the medical sciences. It deals less with facts—though plenty of these are stated—than with general trends of outlook and atmosphere, and it will be found interesting reading by those who have a liking for a mildly philosophical outlook. It preaches sound general doctrine, such as for example that the body works as a whole, and the details seem to be, in the main, as accurate as one can expect from an author who attempts to cover such a large field. The translation is efficient, though one rather doubts whether such expressions as the "precipitation" of sugar on page 90, and the "pus" of a cerebral tumour on page 181 really represent the sense of the original.

THE LANCET

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BACTERIOPHAGE IN CHOLERA

D'HERELLE's early thesis "that the bacteriophage might be used as a benign parasite to wage war upon pathogenic organisms for the benefit of man and beast"[1] naturally aroused more than academic interest, and reference to our columns over the past four or five years will provide sufficient testimony to the energy with which his idea has been pursued. Such a study will, however, make equally clear that in the now considerable mass of literature on bacteriophage therapy there has so far been lacking any substantial measure of agreement about the results obtained and about their proper interpretation. This absence of precision or finality as the outcome of much experimental work has led us repeatedly to urge that only by test on a large scale, carried out with adequate controls, recorded fully and accurately and evaluated statistically, can there be any hope of determining the preventive and therapeutic value of this agent. In 1931 Lieut.-Colonel J. MORISON, addressing the section of epidemiology of the Royal Society of Medicine,[2] whetted appetite for such a formal trial with a preliminary account of the field experiments being carried out in India. Since then these tests have been continued and extended under his direction with the assistance of Dr. E. MILFORD RICE and Dr. B. K. PAL CHOUDHURY, under grants from the Royal Society and the Indian Research Fund Association. The work now extends, therefore, over a period of several years, and the April issue of the *Indian Journal of Medical Research* contains a detailed statistical examination of the large amount of material collected and the results so far reached. This report, which needs close consideration, is divided into four sections. In the first the discussion turns upon the incidence of cholera in areas in which bacteriophage has or has not been utilised as a means of prevention. The second gives an account of district epidemics in villages and upon tea estates. In the third the fatality-rate of treated cases is examined, and in the fourth statistics bearing upon the influence of bacteriophage therapy upon infectivity are analysed.

To measure the effect of bacteriophage upon incidence, two districts in the province of Assam were selected, Nowgong and Habiganj. Each contains a population of over half a million persons, and possesses a dying river, along which, as MORISON has shown, cholera tends to appear; both are situated in the plains, but they are 140 miles apart in different river basins. In Nowgong the distribution of bacteriophage began in December, 1929, in Habiganj not until June, 1932, so that in the latter at present the experimental period is too short to be of service. As controls to the experience in Nowgong the authors take (1) the previous incidence of cholera in the area and (2) the contemporary incidence of cholera in distant Habiganj, and also in similar areas more closely situated. In Nowgong the deaths per 10,000 of the population have been, for 1930, 0·99, for 1931, 0·78, for 1932, 0·46, and for 1933, 0·36. Examination of the death-rates between 1906 and 1929 shows that the lowest previously recorded in the area were 1·34 in 1918, 1·42 in 1920, and 1·62 in 1923. There has been no previous recorded period in which the death-rates for four consecutive years have been comparable with those of 1930 to 1933. The distribution of bacteriophage has thus been associated in time with an abnormally low mortality from cholera. In space, the comparison lies mainly between Nowgong and the district of Darrang, which adjoins Nowgong on the opposite bank of the Brahmaputra. Between 1906 and 1929 there was a considerable degree of association between the level of their death-rates from cholera in each month of the year; between 1930 and 1932 there was none. The mortality both in the adjacent area of Darrang and in the more distant area of Habiganj showed no decline in 1930 to 1933 on the scale of that experienced in Nowgong. "Something," it is said, "has happened in Nowgong which has not happened before and has not happened in the control areas." Of that there seems to be no doubt; but is that "something" the result of the distribution of bacteriophage? The answer must be that the association both in time and space is *perfectly consistent* with that hypothesis, but on the other hand the present limitation of the observations both in time and space makes it impossible to accept the results as yet as definite proof of cause and effect. We cannot be sure that some one or another unknown variable, that may affect the incidence of cholera, has not also changed in Nowgong concurrently with the administration of bacteriophage. For instance, the figures show that in Darrang, the death rate, taking the average of three year periods, fell steadily from 1924–26 to 1930–32, and in 1930–32 was lower than had ever previously been recorded, though remaining at a level considerably above that of Nowgong. A longer period of observation, an extension of the therapy to other areas, will eventually strengthen what is at present a striking and suggestive result.

Further evidence favouring the efficacy of bacteriophage is, however, available in the other sections of this report which deal with fatality and infectivity. In so fatal a disease as cholera the ideal method of evaluation, the use of bacteriophage on alternate cases in villages, was not possible; "it would certainly result in a riot should one form of treatment seem less efficacious than another." The method of analysis, therefore, in comparing treated with untreated cases has been to examine carefully all other factors that might, it was considered, differentially affect the fatality rate —e.g., age, sex, caste, and period of the epidemic in which the cases occurred. For such study results are available from two epidemics.

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[1] See THE LANCET, 1932, ii., 198.

[2] Ibid., 1931, ii., 1311.

The first, in Sibsagar, is divided into three consecutive periods of time, and the fatality rates of the treated and untreated are thus compared at, broadly, each stage of the epidemic. In each of these periods the cases treated with bacteriophage within 48 hours of onset were observed to have an appreciably lower fatality rate than the untreated cases—namely, 24·6, 23·5, and 20·0 per cent. as compared with 51·8, 40·4, and 34·9 per cent. in the untreated. From the results it appears that the bacteriophage-treated patients had their greatest advantage in the earlier and more fatal stage of the epidemic. As the virulence declined, as measured by the decreasing fatality rate of the untreated, the fatality of the treated remained approximately constant—a rather curious phenomenon. Such a form of comparison, however, as the authors point out, may unduly favour the treated group of patients, for cholera is in some cases so rapidly fatal that even when treatment is at hand every case has not the same chance of treatment. The untreated will inevitably have more deaths, for they include the severest cases. To allow for this, the authors adopt the process of excluding from the untreated group all deaths that occurred on the first day of illness, while making no alteration in the treated group. Still it was found that the untreated suffered a greater fatality rate than the treated, while from further analysis it appeared that the administration of bacteriophage upon the first day led to the greatest reduction in mortality. In a second and more virulent epidemic than that of Sibsagar—in the Darrang villages—the mortality in the treated group was nearly half that in the untreated: after, on the principle explained above, deducting the fulminating cases from the untreated group and leaving the bacteriophage group untouched, the fatalities were 78·1 per cent. for the untreated and 44·4 per cent. for those receiving bacteriophage within 24 hours.

Here again we have a strong prima facie case in favour of bacteriophage but we hesitate to accept it as more than that. The authors have certainly done all in their power to prove an equality of characteristics between the treated and untreated groups, but in the absence of a deliberately random allocation of cases to each group one cannot escape the question whether some unknown and possibly important factor may not have been responsible for the fact that "Mr. X" is found amongst the untreated and "Mr. Y" amongst the treated.

To say that rigid proof is still lacking is not to underrate either the importance of the work that Colonel Morison and his associates are carrying out or the value of the evidence they now put forward. Extension of their observations in time and space must place their case for the prevention of cholera by means of bacteriophage on a firmer foundation, and we trust that such an extension will be found possible. The case for treatment is more difficult. Further observations on the same lines can hardly do more than confirm the present result without making it any more secure. A random distribution of cases to the treated and untreated group is the only unassailable mode of procedure, but it is a method that demands, in dealing with human beings, two perhaps impossible requirements—namely, a complete lack of faith in the therapeutic agent employed, and a population "at risk" to which the test can be applied without the differences in the treatment given being conspicuous. Perhaps it is only in fiction that such a situation could be created.

TUBERCULOUS MENINGITIS

The accepted teaching of the pathogenesis of tuberculous meningitis is that it is a part of a general miliary tuberculosis, the blood stream carrying all over the body large numbers of bacilli derived from some focus of disease in the thorax, abdomen, or elsewhere, and the meninges of the brain sharing in this general infection and then becoming the seat of inflammation and exudation. This doctrine has been challenged by Rich and McCordock as a result of a careful anatomical study of the brain and spinal cord in 82 cases of tuberculous meningitis,[1] and quite a different explanation of the origin of meningitis was suggested by them. By careful and complete sectioning of the brain and cord they found in all but 5 of their 82 cases one or more caseous foci in close proximity either to the meninges or to the intraventricular surfaces, and actually extruding caseous material into the subarachnoid space or the ventricles. In the 5 cases where the examination was incomplete, older foci were occasionally found, although evidence of their communication with the surface was not obtained. These foci were visible to the eye, but most of them were beneath the surface of the brain and would easily escape detection in any but a very searching examination of the brain. This proof of the existence of older caseous tuberculous foci in the brain in practically every case of tuberculous meningitis led the authors to the conclusion that the disease results from a local infection with caseous material, heavily loaded with tubercle bacilli, rather than from miliary tubercles in the meninges. It is true that in most cases of tuberculous meningitis, especially in young children, there is also a general miliary tuberculosis which includes the surface of the brain; but in a significant number tuberculous meningitis is present without general miliary tuberculosis. Further in support of the view of Rich and McCordock is the common experience of finding miliary tuberculosis of the lungs, the liver, spleen, and kidneys, without any exudative inflammation of the pleura and peritoneum in close proximity; while yet another point in favour of their theory is that it gives a better explanation of variations in onset and course of the meningitis. The discovery of older tuberculous lesions in the brain in nearly all cases of tuberculous meningitis suggests an analogy with the primary Ghon focus in the lungs. The analogy is not complete, but it goes some distance. In the brain, as in the lung, there is a primary deposit. In both organs it is a small focus and has to be searched for with special care or it will be missed. In the lungs it is deposited by the airways; into the brain it is carried by the blood stream. In the lungs it is generally single; in the brain it is often multiple.

Rich and McCordock's theory would serve to explain the occurrence of such rare cases as are reported on another page by Dr. Macgregor,

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[1] Bull. Johns Hopkins Hosp., 1933, lii., 5; see also The Lancet, 1933, i., 651, and 1933, ii., 192.

Dr. Kirkpatrick, and Dr. Craig, in which a few tubercle bacilli find their way into the cerebro-spinal circulation from an adjacent focus, but fail to set up meningitis. In these cases infection of the cerebro-spinal fluid by tubercle bacilli was proved by animal inoculation. The children all reacted to the tuberculin test, but they neither showed the clinical features of tuberculous meningitis, nor did they develop this complication after a period of many months. In two of the cases the cerebro-spinal fluid was practically normal in its chemical and cellular constitution, and here the type of bacillus was bovine; in the third, the fluid showed an inflammatory reaction similar to that of tuberculous meningitis and was found to contain bacilli of human type. (Of the 214 cases of tuberculous meningitis analysed by Dr. A. S. Griffith in our last issue about a quarter were due to bovine bacilli.)

The interesting results recorded by MacGregor, Kirkpatrick, and Craig were obtained in the course of a study of tuberculous meningitis in children which is still proceeding, and which attempts to correlate its clinical, morbid, anatomical, and bacteriological aspects. They are significant in several ways. They are not presented as examples of recovery from tuberculous meningitis—a rare event of which a certain number of authentic cases are on record, occurring nearly always in older children and adults. They belong to the still rarer group of tuberculous infection of the cerebro-spinal fluid without meningitis. The occurrence of three cases of this kind in the course of one investigation suggests that this condition may be commoner than has been believed. In such cases a general miliary tuberculosis as the result of a heavy infection seems impossible, although there remains the possibility of the escape of a few bacilli from the choroid plexus. The further history of the cases will be of great interest, since their significance is much greater than that associated with rarity. When studied alongside cases of typical meningeal disease they should add considerably to our knowledge of the pathology of tuberculous meningitis. It is desirable that so fatal and so common a disease should be studied in one comprehensive investigation; the new observations on the morbid anatomy of the disease must be tested and verified; the bacilli must be typed; and a complete neurological record of the cases must be made so that clinical and pathological observations may be correlated. When we remember that tuberculous meningitis is not a primary disease; when we are now told that the meningitis is the result of an older focus of disease which may be here, there, or anywhere on the surface or in the interior of the brain, and that the choroid plexus and the spinal cord must not be forgotten; and when we realise that this older local deposit in the brain has come from a primary focus of disease in the thorax, abdomen, or almost any part of the body, we begin to appreciate the labour entailed by a thorough study of the disease from its beginning to its fatal close. Such a task is, of course, beyond the powers of an individual; the collaboration in the Edinburgh investigation of a morbid anatomist, a bacteriologist, and a clinician gives promise of valuable results from the completed study.

THE CHILD WITH POOR SIGHT

"Blindness," as it affects children, was defined by the Education Act of 1921 as "too blind to be able to read the ordinary school-books used by children," and this definition has been extended in practice to cover all whose sight will probably be made worse by following the regular school curriculum. To call these children blind is not only incorrect but harmful, for it creates a quite unnecessary feeling of dread both in the children and their parents. The first recommendation of the Board of Education Committee,[1] presided over by Dr. Ralph Crowley, is that no child should be certified as blind who is unlikely to be put in the class designated by the Blind Persons Act of 1920 as "so blind as not to be able to perform any work for which eyesight is essential." The committee was invited to consider the problems of the "partially blind," and it begins its report by asking permission to call them "partially sighted." This group comprises first, those who cannot follow the ordinary curriculum but can see well enough to be taught by special methods involving the use of sight, and secondly, those suffering from conditions such as myopia, which may be aggravated by following the ordinary curriculum. Most myopic children see well, both at a distance and near at hand, when their refraction is properly corrected; it is on grounds other than defective vision that they need special treatment. Some ophthalmic surgeons indeed doubt whether normal school work has any deleterious effect on their eyes. It is certainly right, however, to take special precautions during any stage of progression as shown by an increase of refraction of more than 1 D a year, by active ophthalmoscopic changes, by deterioration of vision, or by myopia high in relation to the age of the child such as −4 in a child of 6 or −6 in a child of 10. As to partially sighted children who are not myopic but have corneal nebulæ, congenital defects, or cataract, for example, it may be said that those with a visual acuity after correction of 6/24 or worse, with a near vision of J 8 or J 10, need special arrangements. To these may be added those with diseases liable to be progressive, such as optic atrophy and retinitis pigmentosa.

Owing to difference of opinion about the degree of myopia requiring special treatment, it is not really possible to give any estimate of numbers; but the report assumes that it is needed by something like 6000 children (myopes and non-myopes) in England and Wales. Of these about 2600 are already in schools for the partially sighted or in blind schools, and this means that some special educational provision is needed for rather more than 3000 others. The ways in which these children are now being educated and the improvements that ought to be introduced are fully discussed in the report. Special schools, or special classes in ordinary schools, are maintained by 22 different local authorities. Of these London has led the way, having 11 different schools or classes, while Liverpool has 6 special classes, all of them attached to ordinary schools. In sparsely populated areas there is much greater difficulty. For children whose disability is not great the ordinary schools can be used if individual attention is possible—this depending largely on the amount of interest taken in them by the headmaster and on the supervision of the ophthalmic surgeon. Sometimes the only alternative may be a blind school, but the committee hopes that the Board of Education will take immediate steps to require that schools for the blind should admit or retain partially sighted children only if special provision is made for their education by sighted methods. It further suggests that the Board might bring about a reorganisation of the residential blind schools so as to set aside some for partially sighted children only. Otherwise the children are taught by methods which will not fit them for post-school life, and on reaching the age of 16 they are turned out into the sighted world ill-equipped educationally and socially and bereft of the assistance which is available for registered blind persons. Special schools for the partially sighted are now supplemented by special classes in ordinary schools, and the report is largely concerned with the relative merits of these two systems. The special school involves segregation of the children from their sighted mates and the disadvantages of this are so great that in spite of administrative difficulties the committee leans decidedly to the plan of special classes in ordinary schools. Whenever possible, it feels, partially sighted children should be educated in classes forming an integral part of ordinary elementary schools. One objection to the special schools, as at present conducted, is that in most of them no difference is made in the educational treatment of myopes and non-myopes.

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[1] The committee was appointed in 1931, and its report, just published and entitled "Partially Sighted Children," is obtainable from H.M. Stationery Office. 3s.

It is the duty of the ophthalmic surgeon, in the light of his periodical findings, to advise what modifications of the curriculum such as the extension or curtailment of close work or of physical exercises should be made in any particular case. Difficulty often arises over scholarships, but the surgeons consulted by the committee offer little or no evidence that the unrestricted curriculum of the secondary school has proved directly responsible for deterioration of vision of myopic children attending it; and the report maintains that if a child has gained a scholarhip to a secondary school the question whether he should be debarred for ophthalmic reasons from benefiting by it ought to be decided only on consideration of the circumstances and not according to rule. As to the curriculum itself, there are two subjects inviting comment. In the first place myopes in special schools are now commonly forbidden to read at all, and the committee wants to remove this restriction in the case of all but very high myopes or those with serious fundus changes or evidence of rapid increase of myopia. Others should be permitted to read any printed matter that is easily legible to them with their glasses at a distance of about 14 in., with the ordinary precautions against stooping. Secondly, as to physical exercises, at present there are certain restrictions on the syllabus for ordinary schools; for instance, skipping and jumping are forbidden, presumably because myopes are specially liable to detachment of the retina. Unless however there is high myopia, or myopia with fundus changes, this danger is so remote for children that it is legitimate to disregard it. Save in the circumstances just mentioned, the myopic child should be allowed to pursue the full physical training syllabus with the exclusion of exercises which involve sustained bending of the body forward and downward. For those with acute or subacute inflammation in the eyes (trachoma, obstinate phlyctenular disease, or interstitial keratitis) a special hospital school at Swanley is provided. The committee points out that a similar one for the north of England is badly needed.

ANNOTATIONS

THE CAMBRIDGE MEDICAL CURRICULUM

The end of the May term at Cambridge saw the final seal of approval set by the Regent House on the proposed alterations in the examinations for medical degrees. Details will be given in our forthcoming educational number, but it may be convenient to state here the main effect of the changes.

It will be remembered that as long ago as 1931 a syndicate was appointed to inquire into certain difficulties which had arisen and to suggest remedies. The University authorities were struck with the diminishing proportion of medical students who entered for the Natural Sciences Tripos. Whereas at one time almost all did so, soon after the war only 77 per cent. entered. Finally only 44 per cent. embarked on an honours course. The duplication of examinations was a factor in this: students felt it an unnecessary burden to take up for examination the subjects of anatomy and physiology both for the second M.B. and for the tripos. The first step proposed was therefore to exempt from the second M.B. those who reached a qualifying standard in these subjects in the tripos. The next was to include such subjects as general pathology and biochemistry in the first part of the tripos and not merely in Part II., which is only taken by the more advanced students. The syndicate's first report presented in June, 1932 (THE LANCET, July 30th, 1932, p. 256), and discussed by the Regent House in the following October, implemented these changes by the establishment of a Medical Sciences Tripos. This proposal aroused strong opposition on several grounds. Many considered it undesirable to segregate medical students from others working at natural sciences, and some feared for the prestige of the Natural Sciences Tripos if it were in effect thus divided. Others contested hotly that general pathology and biochemistry were subjects of vocational and not of educational value, but were not very convincing in their attempts to discriminate between the two.

The report was therefore referred back to the syndicate and a more acceptable solution was found. But the first report had not been fruitless; it brought out clearly the urgent need for change. Realising this, the Natural Sciences Tripos committee met the syndicate in a generous spirit, with the result that these changes have been accommodated within the four corners of the Natural Sciences Tripos. Another important alteration is that it is now compulsory for a medical student to attain a honours standard in some tripos, not necessarily the Natural Sciences Tripos, before he can proceed to the final M.B. examination. This at once raises the M.B. Cantab. to the status of a honours degree; those who do not wish to read for honours are not excluded, but they will have to content themselves with the diplomas as many now do. It is anticipated that insistence on the attainment of a honours standard in a tripos will reduce the number of rejections in the later M.B. examinations.

The normal course of events for a medical student at Cambridge will therefore run as follows: He can take his first M.B. examination either before or soon after entry. Organic chemistry will now be transferred from the second M.B. to form Part IV. of the first M.B. Physics and mechanics will be telescoped into one part, the remaining parts being inorganic chemistry and general biology. If a student fails to reach the required standard in anatomy and physiology in the Natural Sciences Tripos, or if he has taken some other tripos, he will have to pass a qualifying examination in the defective subject or subjects in the following October or December. If he entirely fails to reach a honours standard he must take the examination again as a qualifying test. The first part of the tripos can be taken at the end of the second or of the third year. Students will, however, be encouraged to take three years over their preparation for it, unless they are considered sufficiently good to proceed to the second part of the tripos. The remaining part of the second M.B., known to generations of students as "Bugs and Drugs," will disappear. An oral examination will be held in pharmacology, and optional questions will be set in that subject in the physiology papers of the tripos. It will be necessary to attend a course of instruction in pharmacology in Cambridge or at some other approved school. A separate examination in general pathology is held to be no longer necessary since it will be a subject of examination in the tripos and in the final examination. The net effect of this will be that a student who enters Cambridge having passed his first M.B. need have no examination beyond his tripos and an oral test in pharmacology until he reaches the finals. And it may be claimed that this change has been effected without in any way impairing the educational value of his training, but in effect enhancing it. All students entering the University from now on will come under these new regulations.

A good deal of unnecessary apprehension has been aroused in the minds of Cambridge medical graduates with regard to the changed regulations for proceeding to the M.D. As before, a thesis will be required, but it has been felt that, in the past, making the thesis the sole requirement has, in effect, discriminated unfairly against those engaged in practice compared with holders of laboratory appointments. The latter are in a better position to compose a thesis on academic lines than are the former. A candidate may therefore present a thesis either of such a standard as will exempt him from further examination or he may thereby establish a prima facie claim to be allowed to show clinical knowledge in the special branch with which his thesis deals. It is not intended to make it harder to obtain the M.D., but to make the conditions fairer for men whose clinical knowledge and experience entitle them to the higher degree.

POST-OPERATIVE PULMONARY COMPLICATIONS

PULMONARY complications continue to rank high in the list of the risks attached to major surgery. In a recent communication H. F. Griffiths[1] has analysed a large series of cases and has drawn some interesting conclusions about the pathogenesis of these complications. He finds that bronchitis and pneumonia occur no less commonly after regional or spinal anæsthesia than after the more commonly used general anæsthetics. At the same time he confirms the general belief that the incidence is largely confined to operations involving the peritoneal cavity, particularly when upper abdominal incisions are used. These facts indicate that it is the site of operation rather than the method of establishing anæsthesia that is mainly responsible. The real trouble, as has been suggested previously in these columns, seems to be that a patient with an abdominal operation wound will not cough if he can avoid doing so, and his bronchial secretions accumulate to set up infection. It is for this reason that, as Griffiths points out, hyperventilation induced by carbon dioxide does no good and may actually make matters worse, except in the comparatively rare cases of massive collapse of the lungs. Griffiths finds that the incidence of pneumonia is greater in the winter months, and that men are afflicted more commonly than women, possibly because they smoke more heavily. There seems to be little reason at present for hope that means will be found to prevent chest complications, since the only way to avoid a painful abdominal incision would be to avoid operating on the abdomen.

FROM THERAPEUTIC TO ACCIDENTAL MALARIA

THE Wagner-Jauregg treatment of general paralysis by inoculation with malaria has for some years been looked at askance by those who have foreseen in this practice the possibility of malaria becoming endemic in areas where it has hitherto been absent. A discussion occurred in July, 1929, at the Congrès de Dermatologie et de Syphiligraphie in Paris, when on the one side this issue was held to be impossible on account of the alleged absence of sexual elements in the blood of the inoculated patients, while on the other side experimental evidence was produced in controversion of this hypothesis. A disquieting, concrete contribution to the solution of this problem was made on May 15th of this year by Dr. R. Martin, Dr. Chassigneux, and Dr. Rouèssé in a communication to the French Academy of Medicine. The case they cited was that of a woman of 24, who had never left France, and who had lived uninterruptedly near Paris for several years. During August and September, 1923, she used to spend her evenings with her husband who worked as a labourer close to an asylum where the subjects of general paralysis were inoculated with *Plasmodium vivax*. She was often stung by mosquitoes, and in September both she and her husband suffered from a benign tertian fever which was promptly cured by quinine. When she had a second attack in April, 1934, *Plasmodium vivax* was found in her blood. While there can be no question of giving up such an effective treatment of general paralysis, it may well be asked if its practice is at present being safeguarded by all the desirable precautions. As pointed out at the French Academy on the occasion of this communication, the persons in charge of this treatment are assuredly experts in psychiatry. But they may be virginal neophytes in the realms of parasitology, ignorant or at least inadequately appreciative of the fact that the parasite of malaria may exist in the blood without provoking fever in its host. Also, on account of lacunæ in their knowledge, they may control the infection for which they are responsible so imperfectly that the patient harbours the malarial parasite for a year or more. The risk of malaria becoming endemic would be reduced if this treatment were to be centralised in institutions staffed by zoologists as well as by psychiatrists, and if the institutions themselves were not to be located in rural areas affording favourable conditions for mosquito life.

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[1] Brit. Jour. of Anæsthesia, 1934, xi., 89.

FLUORINE AND MOTTLED TEETH

Four years ago a mining community in Arkansas, U.S.A., abandoned an otherwise satisfactory water-supply on evidence suggesting that it was responsible for defective enamel formation of the developing teeth in children. The water was from a deep well and inquiry[1] by the U.S. public health service failed to establish the exact nature of the agent which caused the mottled teeth. It was not until later that a connexion was traced between the defect and the presence of fluorine in the water; in a review last year Dr. F. DeEds, of Baltimore, stated[2] that a daily intake of 0·1–0·15 mg. of fluorine per kg. of body-weight was sufficient to mottle the teeth. Cases had then been reported mostly from the western states of America and North Africa. Mottled teeth are now beginning to attract attention in this country. The *Analyst* for June contains a paper by Dr. Guy Barr and Mr. A. L. Thorogood. The National Physical Laboratory have recently examined samples of water from various localities in Essex sent them by Dr. N. J. Ainsworth, L.D.S., who discusses in the same issue the clinical significance of small quantities of fluorides in drinking water. Dr. Ainsworth had first observed mottled teeth in a young patient at Maldon, Essex, and then had gone on to examine a large number of Maldon school-children, when it became clear to him that the condition was identical with that described by Black and Mackay, in 1916, as occurring in many districts of the United States between the Mississippi and the Rockies, notably in Arizona. Dr. Barr's analyses showed that the water of areas where mottled teeth did not occur was free from fluorine, whereas water from the affected areas contained 4·5–5·5 parts per million. It seems clear from American experience that the substitution of deep-well water for that from shallow wells was a frequent antecedent of mottled teeth, some deep well water containing appreciable amounts of fluoride. Coagulation with aluminium sulphate followed by filtration will remove sufficient fluorine to render water harmless, the optimum pH for this reaction being 6·7 to 7·5, preferably near the lower figure. The amount of aluminium sulphate needed is rather large—from 17 to 34 times the fluorine present. The process of determination investigated and recommended by Barr and Thorogood is based on one described by de Boer involving the use of an alizarin-zirconium reagent which gives a pink to yellowish-brown colour with water containing fluorine. The technique described enables an amount of fluorine equivalent to 5 parts per million to be determined with an accuracy of 0·1 part. Maldon is one of the few places where there is a local industry of producing salt from sea-water, but there seems no reason to connect this fact with the occurrence of fluorosis, as Dr. Barr found that the proportion of fluorine to chlorine in sea-water was 170 times less in sea-water than in the positive well-water. The desirability of examining new sources of water-supply from deep wells by the method used by Barr or by some other trustworthy means is clearly indicated.

THE INTRADERMAL REACTION IN BRUCELLA INFECTIONS

There are an increasing number of reports by different workers on the failure to demonstrate agglutinins in the blood in cases of undulant fever. The reason for this is not clear. It may be that unsuitable strains are used for the agglutination test, or that the suspensions are rendered insensitive by the severe treatment with formol or other reagents. Or again it may be that the range of serum dilutions tested is so narrow as to fall within the pro-agglutination zone. These possibilities are mentioned in order that they may be taken into account before the definite conclusion is reached that agglutinins are absent. Whatever the explanation, there is undoubtedly some dissatisfaction with the agglutination test, leading many workers to make use of the intradermal allergic reaction. Though the antigen employed in this test was originally a filtrate of an old broth culture, it seems clear that a simple saline suspension of organisms from an agar culture is equally effective. E. Arbatskaia and H. Moroskin[1] record some results obtained with a brucella suspension heated to 70° C., and standardised to an opacity similar to that given by 2000 million *coli* per cubic centimetre. The intradermal injection of 0·1 c.cm. of this reagent gave rise in allergic patients to an erythematous reaction which became noticeable in 6–8 hours and reached its maximum in 24–48 hours. Besides the erythema there was a red, tender, indurated swelling, sometimes accompanied by a slight rise in temperature and enlargement of the axillary glands. Pseudo-reactions developed within a few minutes, but disappeared completely within 24 hours. Of 35 undulant fever patients tested, 21 gave a positive blood culture, 30 a positive agglutination, and 34 a positive intradermal reaction. Five patients with an absence of agglutinins reacted to the intradermal test, while only one patient with agglutinins gave a negative skin reaction. Non-specific positive reactions were observed in 11 out of 36 tuberculous patients, but when the strength of the bacillary suspension was reduced to 500 million per cubic centimetre, they no longer occurred. In their conclusions Arbatskaia and Moroskin recommend the use of a reagent of this strength in order to avoid occasional skin necrosis and non-specific reactions in highly sensitive patients.

While the interpretation of a positive agglutination reaction is fairly well understood, it is still doubtful what significance should be attached to a positive intradermal reaction. Is it, like the tuberculin reaction, a mere index that the subject has at some time or other been infected with the specific agent, or does it indicate that infection is active at the time? J. D. Goldstein[2] recently tested 253 unselected hospital patients in Rochester, N.Y., using a saline suspension of three-day liver agar slope cultures of *Br. abortus*, killed by heat at 60° C. for one hour, and standardised to 500 million per cubic centimetre. Twenty-six patients injected with 0·05 c.cm. of this reagent reacted positively. Of these, only five had an agglutinin titre of 1/80 or over, while 13 gave histories indicating possible sources of infection with *Br. abortus*. The conclusion drawn by Goldstein from these observations is that the intradermal test is of value in patients with undiagnosed pyrexia, and in afebrile patients without agglutinins whose symptoms may nevertheless be referable to a brucella infection. This conclusion may be correct, but it is certainly going beyond the facts. Far more information is yet required about the development, the intensity, and the persistence of a positive skin reaction in latent and in overt brucella infections before it will be justifiable to diagnose active infection on the basis of this reaction alone. Ample opportunity exists for survey work on the frequency of this reaction in exposed and non-exposed populations and in pyrexial and apyrexial patients.

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[1] THE LANCET, 1931, i., 982.
[2] Ibid., 1933, ii., 368.

[1] Giornal. di Batt. e Immunol., 1934, xii., 979.
[2] Jour. Clin. Invest., 1931, xiii., 209.

RADIATION THERAPY IN CANCER

THE principles which should guide radiation therapy are being eagerly sought in every part of the world where this comparatively new weapon in the war against cancer is being tried. Many observers are devoting their attention to the quantity and equal distribution of the energy used, and to the study of biopsy material and of cancer tissue cultivated in vitro, with the object of noting the radio reactions induced by varying the doses and time-spacing, and establishing a more or less standardised dosage. Dr. Henri Coutard, as will be seen by those who read his lecture printed on another page, approaches the problem from a different angle. His work is based entirely on exceedingly careful observations of clinical facts. From these observations, proceeding step by step, he has been able to demonstrate that whereas in cancers of embryonic type the factor of intensity of irradiation is of chief importance, in the case of differentiated cell growths the time factor may be of equal or even greater importance. The modification of the vasculo-connective and general tissues resulting from the use of large daily doses with an intensity per minute exceeding 5 r would not be of great importance in the embryonic type of cancer; but the same daily doses with the same intensity per minute would, generally speaking, entirely defeat their object if applied to the treatment of highly differentiated cancers. These contrasting results are thought to depend upon the specificity of the cell reaction to radiation. In the embryonic radio-sensitive type of cancer the cells are held to be destroyed directly by the intensive dose, and therefore the end-result is not affected by the modification of the supporting tissues; whereas in the case of tumours of the resistant, differentiated type, only those cells actually in mitosis are damaged early, and the final destructive effect of the irradiation is believed to depend upon the gradual maturation of the remaining cells. This effect does not materialise when the vasculo-connective tissue is substantially altered by the intensity of the daily dose; on the contrary, instead of the malignant cells becoming more sensitive, a condition of radio-resistance is produced in them. According to Coutard, avoidance of damage to the supporting tissues is therefore essential: only a slight reaction is permissible if a good end-result is to be obtained.

Having at first completely failed in the treatment of certain types of cancer, Coutard made careful observations on surface tumours, varying the daily dose and intensity. He was finally able to demonstrate that by using small daily doses of low intensity, and lengthening the total duration of treatment, success could be obtained even in radio-resistant tumours. Using this method he has achieved good results even in infiltrating cancers of the larynx. He finds that the tumour response and radiation tolerance of the vasculo-connective tissue differs in individual cases and cannot be determined in advance; he holds, therefore, "there exists no fixed method of treatment but a simple clinical treatment for each individual patient and for the special type of tumour." The laborious technique carried out at the Fondation Curie involves the concentrated attention of highly skilled workers, and on account of the length of time necessary for the treatment of each case and the quantity of apparatus required can only be carried out at special centres. Even if the particular technique used is not practicable in institutions where large numbers of patients have to be treated and relays of skilled workers are lacking, the facts ascertained at research centres such as the Fondation Curie are of the utmost value. Radiological treatment is still at an experimental stage, and premature attempts at standardisation of dosage are to be deplored. Only by developing centres for clinical study in close coöperation with research laboratories are we likely to make the best possible use of the powerful but dangerous weapon to our hand.

THE BROAD TAPEWORM IN DOG AND PIG

THE presence of *Diphyllobothrium latum* in North America has excited a good deal of interest,[1] and, according to H. B. Cushing and H. L. Bacal,[2] its incidence is increasing in Montreal. The number of patients attending three hospitals in this city for this infection between 1906 and 1928 was 13, and between 1929 and 1933 was 37, 12 of them attending last year. As to the fish which harbour the plerocercoid stage infective for man, no instance of infection was found in those caught in the St. Lawrence river; it was limited to those imported from the Great Lakes during the months when the river fish are out of season. But interest in this matter is being taken in Russia also, and the work which is being done there has not led to the same conclusions as have been drawn in America. It may be recalled that in commenting on the findings of Thomas B. Magath and Hiram E. Essex[1] (that in only 1·5 per cent. of eggs of this tapeworm passed by the dog was there development of the coracidium which infects the first larval host) we emphasised the fact that since dogs may harbour many adult worms they may pass many eggs, so that these may tend to make up in quantity what they lack in infective quality. Investigation by Wictor Tarassow[3] shows, however, that such a poor potential infectivity as this is no necessary attribute of eggs from the dog. True, these develop more slowly than do those from man, for in 14 to 16 days the coracidium has appeared in 7·8 to 9·2 per cent. of eggs from the dog as against 72 to 73 per cent. of those from man; but after 21 to 25 days the figures are just over 50 from the dog and just over 75 from man. Quite clearly it cannot be taken for granted that the dog is a negligible factor in the spread of this tapeworm to man. In this respect Tarassow has implicated the pig also as a definitive host alternative to man. He himself swallowed, and he fed to each of two pigs, six plerocercoids, the stage in the pike infective for the definitive host, and in all three instances two adult worms developed. He next dissected 15 swine from four different villages. In three of the villages fish were eaten and the offal thrown to pigs, and 8 of 11 of these harboured the broad tapeworm; in the fourth village fish was not eaten and none of 4 pigs was infected. Prophylactic measures against this worm must be given a considerably wider range than has hitherto been generally realised.

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[1] See THE LANCET, 1931, ii., 1089.

[2] Canad. Med. Assoc. Jour., 1934, xxx., 377.

[3] Arch. f. Schiffs- u. Trop.-Hyg., 1934, xxxviii., 156.

ANOTHER GENERAL ANÆSTHETIC

READERS of Dr. Bourne's paper on cyclopropane in obstetrics (p. 20) will be interested to hear of a brief article on the drug which appears in the May number of the *Magazine* of the University of Leeds Medical Society. The author, Dr. W. Stanley Sykes, has used cyclopropane so far in only a few cases, but his experience has been very satisfactory. Obviously it has great merits as a gaseous anæsthetic. It is as innocuous as nitrous oxide so far as effects on blood chemistry and on internal organs are concerned, yet it is far more potent and gives better muscular relaxation. The practical drawback to its wide employment is the high cost of its production. This obstacle is overcome, however, when well-constructed machines are used for its administration, these comprising a carbon dioxide absorption chamber, so that the cyclopropane can be breathed over and over again. The drug is now being investigated in this country under the auspices of the Anæsthetics Committee (Medical Research Council and Royal Society of Medicine) and we shall be surprised if in the future it does not secure an important place among general anæsthetics.

MECHANISM OF RELIEF OF CHEST PAIN AFTER THYROIDECTOMY

COMPLETE thyroidectomy, which is now being undertaken extensively in America for patients with angina pectoris and congestive heart failure,[1] has now been found by Weinstein, Davis, Berlin, and Blumgart[2] to relieve immediately chest pains not associated with exertion, and the skin hyperæsthesia and tenderness of the deeper tissues of the chest wall not uncommonly found in cases of chronic heart disease. The more permanent relief of angina and of the symptoms of severe heart failure which results from the removal of the normal thyroid usually sets in only some weeks after operation, at a time when the basal metabolism has undergone considerable reduction. The immediate relief of symptoms cannot be explained by the reduction of basal metabolism, and the authors suggest that the relief is due to interruptions of nerve impulses from the heart resulting from the operation, and is comparable to the effect of cervical sympathectomy. In three anginal cases in which hemithyroidectomy was done as a preliminary, exertion taken within two weeks of the operation produced anginal pain only on that side of the chest corresponding to the thyroid lobe left in situ. Between the second and eighth weeks after operation pain was again felt on the operated side, but after a second operation to remove the remaining part of the gland, and when the metabolic rate had fallen considerably, there was permanent relief from angina. The thesis set out is thus that of a double mechanism—the immediate temporary relief of chest pains and tenderness after complete thyroidectomy being due to the interruption of different impulses from the heart at the time of operation, while permanent relief is dependent on the reduced work of the heart associated with the development of the hypothyroid state.

"MEN IN WHITE"

THE reading-room of the staff club at "St. Jude's Hospital" is not a restful place, and the resident staff who appear in Sydney Kingsley's play at the Lyric Theatre lead anything but restful lives. Loud speakers throughout the hospital keep calling attention to the fact that George Ferguson, F.R.C.S. (the hero), is wanted on the telephone; and this leads his fiancée to put her foot down and demand that he shall take surgery rather less exclusively after his approaching marriage. The conflict between love and a career is thus set going in earnest, and she finds a strong antagonist in a senior surgeon (excellently played by Mr. Lewis Casson) who wants Ferguson to abjure easy practice and serve a long and stern apprenticeship to his profession. A scene in which the young man disobeys a physician's orders and thereby saves a child's life at once endears him to the audience, and he retains our sympathy and respect through the appalling complications that arise from his relations with a young probationer nurse. These lead to a scene in the operating theatre which borders on the improbable but includes a striking exhibition of routine aseptic and antiseptic precautions. The technical side of the play is, indeed, almost beyond criticism, and Mr. Robert Douglas as Ferguson gives a consistent and convincing performance; but even after being anglicised by Dr. "Merton Hodge" the story remains faintly transatlantic in tone. Apart from the behaviour of the hospital board of governors, there was little in the play that could be called enlivening; and though many people will enjoy the chance of seeing behind surgical scenes, the central problem really makes less impression than the ingenuity with which a special department of life is presented.

Surg. Rear-Admiral R. W. B. Hall, C.B., O.B.E., has succeeded Surg. Vice-Admiral Sir Reginald St. G. S. Bond, K.C.B., as Director-General of the Medical Department of the Navy.

Dr. Robert Hutchison has been elected president of the Royal Society of Medicine for the coming year. The names of the new presidents of sections will be found in our news columns.

THE death is announced, as having occurred on Wednesday, of Madame Marie Curie, the joint discoverer with her husband of radium.

IT is announced that Mr. Edward William Meyerstein has given £70,000 to the rebuilding scheme of the Middlesex Hospital, bringing his magnificent benefactions up to the sum of £100,000.

WE regret to announce the death on Tuesday last of Sir James Kingston Fowler, consulting physician to the Middlesex Hospital and well known both for his work in relation to tuberculosis and as an authority on medical education.

THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.—Applications are invited for the Wandsworth scholarship, which will be vacant in October. The scholar must undertake research in tropical medicine and will be expected to spend a substantial part of his time overseas. Further particulars will be found in our advertisement columns.

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[1] THE LANCET, 1934, i., 303.
[2] Amer. Jour. Med. Sci., June, 1934, p. 753.

PROGNOSIS

A Series of Signed Articles contributed by invitation

IX.—PROGNOSIS IN SURGICAL TREATMENT OF PEPTIC ULCERS

"Out of this nettle, danger, we pluck this flower, safety."

THE public have long known what many surgeons have failed to grasp, that no operation is free from danger and risk of life. What every patient wants to know is the extent of this risk and the chances of ultimate cure; and yet of all branches of surgery this is the most uncertain. To be analysed and fully appreciated the results of operation have to be put in a statistical form, but when so expressed they are dependent upon so many factors that they will seldom remain undisputed. The most important duty of a surgeon is to know when not to operate, for patients who can be cured medically should never be subjected to operation; but the inclusion of many of these milder cases will do much to improve the surgeon's statistics. If surgery be imperative the wise choice of operation will not only give a lower operative mortality-rate but a higher percentage of ultimate cure, but in some cases unsatisfactory end-results compel the rejection of a relatively safe operation for one carrying a rather higher risk. Above all, the results of any one operation will largely depend upon the surgeon who performs it. One surgeon may perfect one method, another a second. Hence it is impossible to state that any one operation performed for a certain lesion will universally be followed by a given percentage of deaths or cures. Only by the study of a large series of his own cases is the surgeon able to inform his patients of the results they may expect from the procedure he advocates.

In the present article the selection of cases for surgical treatment cannot be discussed. The results are based upon a study of 1805 operations personally performed. The patients had all previously been treated medically but only 1727, which have been followed for periods of 1–21 years, are analysed.

PYLORIC AND DUODENAL ULCERS

The commonest type of peptic ulcer is that in the duodenum. At times such ulcers may extend in part beyond the pyloric vein on to the stomach and since my own experience has been that such may occasionally be followed by carcinoma, a complication which does not follow a true duodenal ulcer, they have in my own series been analysed separately. Their treatment, however, is identical and therefore for present purposes they will be considered together. Generally speaking three methods of treatment have been advocated: (1) gastro-duodenostomy, with or without excision of the ulcer; (2) gastro-enterostomy, anterior or posterior; and (3) partial gastrectomy. It is in the choice of these operations that so much divergence of opinion has been expressed by different surgeons.

It has been claimed that gastro-duodenostomy allows of direct attack upon the ulcer and is not followed by gastro-jejunal ulceration, and that partial gastrectomy, by permanently lowering the acidity, almost entirely abolishes the later onset of gastro-jejunal ulceration. It is by perfecting the technique of one or other methods that different surgeons have obtained such varying results. My own choice on both theoretical and practical grounds has been for gastro-enterostomy. By firmly embedding the ulcer the dangers of hæmorrhage and perforation are overcome, while the gastro-enterostomy is a safe procedure with very good end-results. The risk of operation should never be above 2 per cent., whereas the published statistics of partial gastrectomy even in the case of its most skilled exponents lies in the neighbourhood of 6 per cent. The danger of subsequent marginal ulceration in my own cases has been rather over 3 per cent., so that the mortality of gastro-enterostomy together with the subsequent incidence of marginal ulceration is less than the mortality of partial gastrectomy, which in my opinion should be left for those cases that later do develop such ulceration.

In my own series there were 784 cases of uncomplicated ulcers in this situation treated by gastro-enterostomy. The mortality was rather under 2 per cent. and it included a consecutive series of 283 cases without a death. When it is remembered that these are all patients who had been seen by a physician and treated by medical methods it will be realised that in such a series the risk to life from perforation or hæmorrhage, if no operation had been performed, would probably have been considerably higher than this.

A number of the patients in the series who had been watched for not less than five years were carefully investigated for the collective investigation of the British Medical Association[1] and this investigation showed that 84·9 per cent. of them were completely cured. Many of these patients were working men of the hospital class who, owing to the nature of their work, were unable to take any dietetic precautions and yet remained free from all trouble. Of the total group of 784 cases, 26 subsequently developed gastro-jejunal ulcer and this complication necessitated further operation. Six at a rather later date showed the onset of carcinoma. However, in 3 of these the carcinoma only occurred after a long period and at a site remote from the ulcer and therefore were not related either to the ulcer or to the operation. It is true that the condition would have been prevented by a partial gastrectomy, but this is no more reason to advocate that measure than it would be to perform it in normal people as a preventive of subsequent carcinoma.

My own views therefore are that cases of duodenal ulcer should be treated medically in the earlier stages. For the resistant, progressive, or complicated cases gastro-enterostomy is the operation of choice. When so treated about 85 per cent. will be completely cured. The mortality will not be more than 2 per cent., gastro-jejunal ulceration will occur in about 3·3 per cent., and about 0·7 per cent. will later develop carcinoma of the stomach. In none of the cases so treated in my series did a severe anæmia supervene.

Gastrectomy.—Since for the above reasons my own choice is for gastro-enterostomy combined with embedding the ulcer, there are in this series only a few cases treated by partial gastrectomy, the method being advocated only for those patients who showed a very high acidity or where there was some other complication. Of the 20 patients so treated two died, and one developed a gastro-jejunal ulcer. There were no examples of subsequent carcinoma or profuse anæmia. There were also only 15 cases treated by gastro-duodenostomy. But here again a fair comparison cannot be drawn; they were all unusual or complicated cases and the real value of this operation can only be obtained from the figures of those surgeons who use the method frequently, and a discussion of such figures would be out of place in this communication. Of the 15 cases two died, but in the survivors there were no complications.

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[1] Brit. Med. Jour. 1928, ii., p. 784.

LESSER CURVE ULCERS

It is now universally accepted that many such ulcers are cured medically and therefore the results of operation, as discussed here, only apply to those cases where this treatment has been tried, or to cases referred by a physician for surgical treatment. For this lesion there is an increasing tendency to choose *partial gastrectomy*. This is especially so on the European Continent where practically no other operation is performed and the practice shows some signs of spreading to this country. As already mentioned, even in the hands of the most expert exponents of this operation, the mortality is in the region of 6 to 8 per cent. Moreover it would seem to be theoretically incorrect to remove some three-quarters or seven-eighths of the stomach in order to excise a small chronic ulcer which may be only one or two centimetres in diameter. It is therefore my custom to treat these cases by one of three methods, according to the nature of the ulcer.

Wedge resection, with temporary occlusion of the pylorus and gastro-enterostomy.—All small ulcers in the middle of the lesser curve which are manifestly benign in nature are treated by this method.

The ulcer is excised by a wide wedge after the arteries have been tied, or more rarely destroyed by the cautery. The opening so formed is sutured, the pylorus occluded temporarily with a running silk suture and a gastro-enterostomy performed, the stoma running parallel to the greater curve and so placed that one-half lies proximal and one-half distal to the line of suture of the wound of excision.

In my own series 310 patients were so treated with 13 deaths, a mortality of 4·2 per cent., and in a group which were watched for a minimum of five years there were 88 per cent. complete cures. Of the total, six, two of which were excised by the cautery, developed recurrent ulcers and five showed the later onset of carcinoma. There was one case of severe anæmia following the operation.

Partial gastrectomy.—In some cases where the ulcer is large and adherent to the pancreas or there is much surrounding induration, a wedge resection would necessitate the removal of so large a portion of the stomach that considerable deformity would result.

In this type of lesion and in all those in which there is the slightest suggestion, either in the symptoms or in the appearance at operation, of the presence of early carcinoma a partial gastrectomy should be performed. The drawback of this operation lies in its somewhat higher operative mortality, but in spite of the theoretical objections to the removal of so much healthy stomach, the end-results, with the exception of the relatively small danger of the onset of severe anæmia, are remarkably good.

In my own series there were 240 cases of chronic ulcers so treated with 30 deaths, a mortality of 12·5 per cent. This is considerably higher than many published series, but the method has only been used for the larger and more serious ulcers. There were no examples of recurrent ulceration or of the onset of carcinoma, but four later developed severe anæmia. In the series watched for a minimum of five years 70·2 per cent. were completely cured, the figures being lower than the last series owing to the higher primary mortality.

Gastro-enterostomy.—In some cases the ulcer is so large or is situated so high up on the lesser curve that either a complete gastrectomy would be necessary or the partial gastrectomy would be so extensive and difficult that it would carry with it a high mortality.

In such cases it is my custom to perform a gastro-enterostomy as a palliative operation. Should carcinoma be present the relief will of necessity be only temporary, but even a partial gastrectomy in such conditions would be certain to be followed by recurrence. *In about 40 per cent.* of the cases a cure will result, while in the remainder the ulcer will persist but usually becomes *so much smaller* that an excision becomes possible at a later date. Some of the patients are gravely ill, so that even so simple a procedure is associated with a relatively high mortality.

In my own series of 17 cases there were five deaths. There were also five cases in which the ulcer persisted *and a second operation* was necessary. It may be said then that of all surgical ulcers of the body of the stomach which are treated by methods varying with the nature of the lesion the total mortality will be approximately 7·5 per cent. Some 80 or 85 per cent. will be completely cured, 1·7 per cent. will develop recurrent ulceration, about 1 per cent. will show the *onset of profound anæmia at a later date*, and less than 1 per cent. will develop subsequent carcinoma.

ULCERATION WITH SEVERE HÆMATEMESIS

The most difficult class of case to treat is that of severe hæmatemesis from peptic ulceration. There is *no doubt that many such cases die if treated* medically, but on the other hand, they are very bad subjects for surgical interference, even if the operation be preceded by a blood transfusion. As a general rule the diagnosis between hæmorrhage from an acute or chronic ulcer is not difficult, but at times the patient is so seriously ill that an accurate history cannot be obtained, and since hæmorrhage from an acute ulcer usually abates under medical treatment, the decision is one of considerable importance. In actual practice no hard-and-fast rule can be made. To treat all cases of severe hæmorrhage surgically would lead to a high mortality, but if surgical treatment be denied to the patient many lives will be lost. Every case therefore must be regarded as a problem in itself, a problem in which each surgeon may hold opposing views. It thus becomes almost impossible to give a prognosis which in any degree approaches accuracy. The mortality is of necessity high, for only those cases will be selected for operation which it is thought will die if left. The *nature of the operation* will also vary in the hands of different surgeons. A bleeding duodenal ulcer can nearly always be controlled by embedding the ulcer and completely occluding the duodenum, and then performing a gastro-enterostomy; but for gastric ulcers the operation may consist of exposing the ulcer and ligating the bleeding points, ligating the arteries passing to the ulcer, [illegible] even performing a partial gastrectomy. In my own series there were 50 cases treated surgically and the mortality was between 20 and 25 per cent., *but it is impossible to estimate how many of these cases would have died without operation.*

PERFORATED ULCERS

Whereas in the last group of cases discussed the surgeon's difficulty lies in coming to a decision whether to operate, in this group there is no such difficulty. In the presence of so grave a disaster practically every patient will die if no operation be undertaken, and therefore it is the surgeon's duty to operate even if only 1 per cent. of the patients can be cured. Fortunately, with the growth of knowledge and a realisation of the importance of early operation the *dangers of perforation* have been enormously decreased. In my own series, as in every one published, the importance of the *time factor is manifest* and more credit is due to the practitioner who makes an early diagnosis and insists upon immediate *operation* than to the surgeon who performs the operation. In cases operated upon within the first twelve hours the mortality should not be greater than 5 per cent., and the fall in the mortality of the more recently published series is almost wholly due to the inclusion of a larger number of cases treated in this period. Recently published series show a total mortality of not more than 15 per cent. as compared with the 50 per cent. to 60 per cent. of a few years ago. The question as to whether the operation should consist of a simple suture, or whether this step should be combined with a gastro-enterostomy or even whether a partial gastrectomy should be performed, is one which has led to considerable dispute. The surgeon must always keep in mind that his first duty is to save the life of the patient and the possibility of subsequent trouble becomes of relatively minor importance. If he feels that the patient's condition is quite good, that the perforation has been recent, and that he can perform a gastro-enterostomy in a few minutes, he may be wise to carry out this step at the first operation, but if he is at all dubious he should be content with a simple suture, if necessary combined with drainage; but in such cases the patient must always be carefully watched afterwards and if the ulcer persist a second operation undertaken at a later date.

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SPECIAL ARTICLES

EPIDEMIOLOGICAL SIGNIFICANCE OF THE SEROLOGICAL TYPES OF PNEUMOCOCCI

BY IAN M. CHRISTIE, M.D. Glasg., D.P.H.
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THIS paper describes a study of the incidence of the different types of pneumococci in patients and nurses in Knightswood Fever Hospital from April, 1932, to May, 1933. The nursing staff was taken as a selected healthy community, and examinations as to the type of pneumococcus present were made on each nurse at least once a month. The findings recorded are those obtained by repeated examination of 100 healthy adults for varying lengths of time during the 13 months of the investigation, the average period of observation being eight or nine months and the minimum four months. The method employed throughout was the intraperitoneal injection of mice with sputum or mucoid material from the back of the throat, and subsequent typing by means of appropriate antisera. Before proceeding to a discussion on these points it is necessary for the proper appreciation of the significance of changes in the nasopharyngeal pneumococcal flora of the persons examined to include a brief description of the prevalence of acute respiratory diseases in Glasgow and the type of pneumonia admitted to hospital during the period of study. The findings of the investigation are then submitted with reference to, first, the Group IV., then Types I. and II., and lastly, Type III. pneumococci.

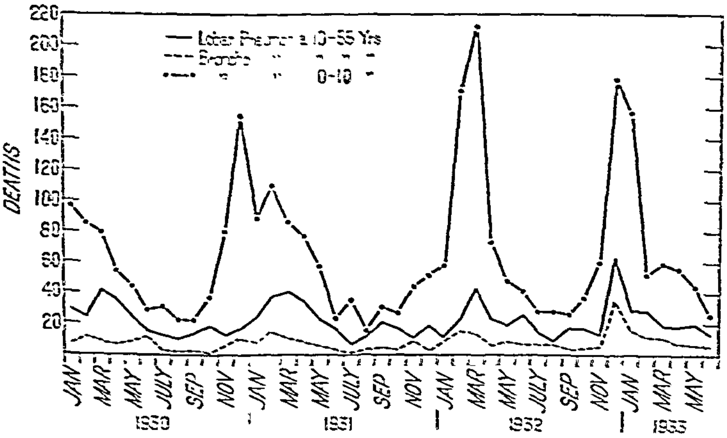

FIG. 1.—Deaths from acute respiratory disease in Glasgow (1930–33).

PREVALENCE OF ACUTE RESPIRATORY DISEASES IN GLASGOW FROM JANUARY, 1930, TO JUNE, 1933

These epidemiological happenings are illustrated in Fig. 1, in which is set forth the deaths notified each month as lobar pneumonia and broncho-pneumonia in the age-period 10–55 years, and also the number of deaths from primary broncho-pneumonia under the age of 10 years. The first two graphs were chosen because of the fact that the age-group 10–55 represents the period of predilection for lobar pneumonia, the corresponding figures on the incidence of deaths from broncho-pneumonia in adults being included for the sake of contrast. The third graph gives the number of deaths notified as acute primary broncho-pneumonia in children which is a much less easily definable class. It is necessary to point out that the course of these different respiratory infections was complicated by an outbreak of influenza which occurred in Glasgow in December, 1932.[1] With regard to the curve of deaths for lobar pneumonia, it will be noted that the disease occurred in periods of high prevalence at regular intervals of approximately 12 months. In the years 1930–32 the highest level was always in the month of March, but the fourth elevation occurred three months earlier than was customary and coincided with the outbreak of influenza in December, 1932. The two periods of high prevalence of lobar pneumonia in 1932 were in the nature of explosive outbreaks, there being a sudden rise to a peak level followed by a more gradual fall. They contrast markedly with the curves of incidence in 1930–31, when there was a broader and more sustained graph. The curve of broncho-pneumonia in adults, apart from a gentle rise each spring, ran a very even course until December, 1932, when it participated in the sudden rise of acute respiratory disease associated with the influenza epidemic. The incidence of deaths notified as acute primary pneumonia in children is of particular interest. In 1930–31 there was no definite association with the curve for lobar pneumonia, but in 1932 there was a complete change, the curve of deaths from acute pneumonia in children corresponding exactly with the two epidemic periods of lobar pneumonia and this prevalence in children being much more intense than the incidence in adults.

TYPE OF PNEUMONIA ADMITTED TO KNIGHTSWOOD HOSPITAL

The present inquiry was begun in the spring of 1932, when the epidemic of lobar pneumonia was in progress, and was continued throughout the period of influenzal prevalence which occurred at the end of the year. As was mentioned above, the influenzal outbreak was accompanied by a high incidence of lobar penumonia,[2] and it is of interest to note that a marked alteration in the types of infecting pneumococci was observed in the cases admitted to hospital at that time.[3] This is illustrated in Table I., which sets forth the frequency and fatality percentages of the cases during the two periods.

TABLE I

A Comparison of the Incidence and Type of Lobar Pneumonia admitted during Two Epidemic Periods of Pneumonia and Influenza Respectively

—	Lobar pneumonia period. Feb.–June, 1932.				Influenza period. Dec., 1932–Jan., 1933.			
	Cases.	Deaths.	Frequency (per cent.).	Fatality (per cent.).	Cases.	Deaths.	Frequency (per cent.).	Fatality (per cent.).
Type I. ..	47	12	42·0	25·5	14	1	23·3	7·1
Type II. ..	41	10	36·6	24·4	32	12	53·3	37·5
Type III. ..	2	2	1·8	100·0	7	3	11·7	42·6
Group IV. ..	22	1	19·6	4·5	7	—	11·7	—
Total ..	112	25	—	22·3	60	16	—	26·7

The Table demonstrates how the incidence of Type I. pneumonia fell from 42 per cent. in the first period to 23·3 per cent. in the second period, with an accompanying diminution in mortality of 18·4 per cent., whereas the incidence of Type II. infections rose from 36·6 to 53·3 per cent. with an increase in death-rate of 13·1 per cent. The Type II. infections during the influenza period were severe at all ages, and the excess of Type II. over Type I. illnesses persisted throughout the first six months of 1933. The frequency percentages for Type III. pneumonia showed a very marked increase which was accounted for by these infections occurring in elderly people already weakened by concurrent influenza.

It might appear then that the outbreak of influenza not only precipitated the seasonal prevalence of lobar pneumonia, but initiated a very marked alteration in the character of the infecting pneumococcal types.

The salient points elucidated may be summarised as follows: (*a*) During the year 1932 lobar pneumonia occurred in epidemic form on two occasions. (*b*) Both these periods of epidemic prevalence were accompanied by corresponding epidemics in children. (*c*) The second epidemic period coincided with an outbreak of influenza in the city, and was associated with a marked alteration in the character of the infecting pneumococcal types. (*d*) In the years 1930–31 a high incidence of lobar pneumonia occurred in the spring months, but epidemic features were not so prominent, and the inter-relationship between the incidence of the disease as it occurred in the adult and in the child not so apparent.

Group IV. Pneumococci

The behaviour of these organisms in the nursing staff during the two epidemic periods is illustrated in Fig. 2, which shows, that along with and following the high incidence of lobar pneumonia in the spring of 1932, there was a correspondingly high percentage of Group IV. pneumococci. This incidence of Group IV. organisms tended to follow the case incidence of lobar pneumonia. There was a fall in the Group IV. curve from 71 per cent. in April to 27 per cent. in August, after which the carrier-rate gradually rose to 38 per cent. for December. In January the curve fell to 31·5 per cent., but rose to a peak of 48 per cent. in March, dropping to 36 per cent. in April. The incidence of the Group IV. organisms thus showed a considerable degree of fluctuation, a feature which is not in accordance with the findings of some other observers. Rosenau, Felton, and Atwater [4] recovered pneumococci from samples of the community in proportions around 90 per cent., with only a moderate degree of variation. Cruickshank [5] also found the percentage of pneumococci in the throats of inmates of a mental institution to be constantly between 92 and 100 per cent. On the other hand, the report [6] on a study of the nasopharyngeal bacterial flora of a group of the Manchester population, over the period July, 1925, to September, 1927, states that "the fluctuations in the pneumococcal carrier-rate were curious and unexpected."

The incidence of the Group IV. organisms in the 100 nurses comprising the selected healthy community showed a marked difference in the results obtained by one exmination of each person as compared with those obtained by repeated examinations, a fact which is brought out in Table II.

TABLE II

Incidence of Pneumococci in 100 Healthy Persons

Types of pneumococci isolated.	Results obtained by—		
	Single examinations.		Repeated examinations.
Group IV.	40	55 per cent.	85
Type III.	9		17
Type II.	4		15
Type I.	2		8
Nil	45		15

It will be seen that the percentage of pneumococci isolated by a single examination of each person was 55, Group IV. organisms accounting for 40 per cent., but by means of repeated examinations Group IV. organisms were recovered from as many as 85 per cent. of the series. The occurrence of Group IV. organisms in individual nurses showed that persistence of the organism in any one person was not a common feature. In a minority of cases the organisms were recovered on successive examinations over a period of five to eight months, but generally the carrier state was markedly intermittent in character.

To obtain further information as to the significance of these Group IV. organisms, 36 strains were typed by means of antipneumococcal sera for Types IV.–XXXII., the antisera being kindly supplied by Miss Cooper,[7] of the Bureau of Laboratories, Department of Health, New York. The proportion of Group IV. strains classified by means of the additional antisera is contrasted with a further series isolated from (1) adult convalescents in pneumonia pavilions and (2) adults and children suffering from acute pneumonia, the results being set forth in Table III.

TABLE III

Proportion of Group IV. Strains Typed by Antisera IV.–XXXII.

Source of strains.	Examined.	Strains that typed.	Strains that remained unclassified.
Healthy persons ..	36	17	19
Adult convalescents ..	36	20	16
Acute pneumonia ..	28	16	12
Total	100	53	47

It will be seen that by means of these additional antisera 53 per cent. of the series were further classified. In all 18 different types were isolated and the incidence of these is demonstrated in Table IV.

TABLE IV

Incidence of 53 Group IV. Strains Classified by Antisera IV.–XXXII.

Type of pneumococcus.	Number typed.	Type of pneumococcus.	Number typed.
IV.	6	XV.	1
V.	2	XVI.	2
VI.	10	XVII.	1
VIII.	5	XVIII.	1
IX.	2	XX.	4
XI.	2	XXI.	6
XII.	2	XXV.	1
XIII.	2	XXXVIII.	2
XIV.	3	XXX.	1

Apart from the Type VI. pneumococcus the different types were uniformly distributed. A Type VI. pneumococcus was isolated on ten occasions, six occurring in infants with acute broncho-pneumonia, three in adult convalescents, and one in an adult with broncho-pneumonia.

Some interesting points were noted in dealing with these strains. The degree of significance to be attached to the recovery of Type VI. pneumococcus from the throat was variable. In a child with acute pneumonia a Type VI. strain and a pneumococcus unclassified by sera IV.–XXXII. were isolated from the throat on two separate examinations during the acute phase of the illness. Two weeks later the child developed an empyema, from the pus of which Type I. pneumococci were obtained. On the other hand, in a fatal broncho-pneumonia in a child of two and a half years with mild conjunctivitis and otorrhœa, Type VI. organisms were isolated not only from the throat but also from the conjunctival and aural discharges. It is probable that in the first case the organisms appeared as temporary parasites, and that in the second they were the real cause of the illness. A noteworthy finding was recorded in a child of six months. At the onset of an acute broncho-pneumonia a Type XIV. pneumococcus was isolated. Ten days later, when the illness was at its height, a second examination was made with the result that well-marked agglutination occurred with every type antiserum from I.–XXXII. One other feature was the tendency for neighbouring types to be isolated at one time; Types XXVIII. and XXX., Types XIII. and XIV., and Types XX. and XXI. being isolated from individuals living in close association. Regarding the unclassified strains, 12 were isolated from cases of acute pneumonia, of which 6 were lobar and 6 broncho-pneumonic in character. The remaining 35 were recovered from convalescents and healthy persons.

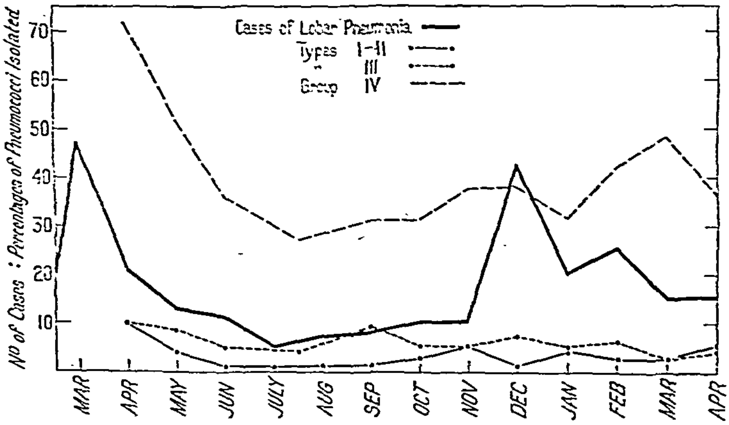

FIG. 2.—This chart shows the number of cases of lobar pneumonia (thick black line) in Knightswood Hospital from March, 1932, to May, 1933; and also the percentage of nurses harbouring pneumococci of various types during the same period.

Types I. and II. Pneumococci

From Fig. 2 it will be observed that the carrier-rate of Types I. and II. pneumococci in the nursing staff was as high as 10 per cent. in April, 1932, following the first epidemic period, but remained continuously between 1 and 5 per cent. throughout the rest of the investigation. The distribution of these organisms is illustrated in Table V., in which is presented a comparison of the pneumococcal flora in the throats of 60 nurses during their period of training in pneumonia pavilions; with that obtained from a control series consisting of 75 nurses who had not previously served in these wards.

TABLE V

Incidence of Pneumococci in the Throats of 60 Nurses in Pneumonia Pavilions and 75 in Control Wards (April, 1932, to May, 1933)

Types of pneumococci.	Pneumonia wards.		Control wards.	
	Positive.	Per cent.	Positive.	Per cent.
I. ..	8	13·3	—	—
II. ..	13	21·7	2	2·7
III. ..	7	11·7	11	14·7
IV. ..	53	88·3	59	78·8

The figures were obtained by means of repeated examinations, and they clearly demonstrate how, with two exceptions, the incidence of the Types I. and II. pneumococci was confined to nurses serving in pneumonia wards.

In these wards 21 nurses proved to be carriers of Types I. and III. pneumococci at one time or other, whereas, in the control series, there were only two Type II. carriers who were stationed in diphtheria and scarlet fever pavilions respectively. During the first half of the study there was an equal number of Types I. and II. carriers, but in the second portion when a preponderance of Type II. infections occurred there was an increased proportion of Type II. carriers. Two nurses proved to be persistent carriers of these organisms for periods of three and five months respectively, but otherwise the carrier state was short-lived.

The feature of these results is that the case of lobar pneumonia is the source of spread of the two chief pathogenic types and that nurses in attendance on such cases are liable to become carriers of these organisms, usually for a short space of time, but without any apparent danger to themselves or to others. The significance of this is increased by the fact that a similar incidence of Types I. and II. pneumococci was found among patients in pneumonia wards admitted with conditions other than Type I. or II. pneumonia, and it is evident then that in this particular pneumonia pavilion there was a continuous frequency of Types I. and II. pneumococci for a period of at least one year; and that a not inconsiderable number of patients admitted with conditions other than pneumonia together with the nurses on duty in these wards were exposed to this high concentration of Types I. and II. pneumococci, and yet in no instance did any of these persons develop a pneumonia due to these types.

Type III. Pneumococci

The behaviour of the Type III. pneumococcus as a nasopharyngeal parasite in the community is of peculiar interest. Avery and others[8] in 1917 *recorded the percentage of Type III. pneumococci* among normal persons in New York to be as high as 28 per cent., but in this country the incidence has usually been *estimated between 5 and 10 per cent.* In the present study, however, as a result of repeated examinations the Type III. pneumococcus was recovered from 17 per cent. of the normal persons examined, a percentage which is more in keeping with the American figures. Furthermore, it was found that once established in the nasopharynx the Type III. pneumococcus showed a greater tendency to persist than did the organisms of Types I., II., or Group IV. This is demonstrated in Table VI. in which is set forth the incidence of these organisms in 11 Type III. carriers upon whom repeated examinations were made for at least five months after the detection of the carrier state.

TABLE VI

Illustrating Degree of Persistence of Type III. Pneumococcus in 11 Normal Persons

Carriers.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
A ..	III.	III.	III.	..	III.	III.	III.	III.	III.	III.	..	..	..
B ..	III.	III.	—	..	IV.	III.	IV.	III.	III.	III.	III.	III.	III.
C ..	III.	—	IV.	..	III.	III.	—	IV.	III.	III.	—	—	—
D ..	III.	—	—	..	III.	—	III.	IV.	IV.	IV.	IV.	—	—
E ..	III.	—	—	..	..	III.	III.	II.	—	IV.	—	—	..
F ..	IV.	IV.	—	IV.	III.	IV.	—	—	—	—	—	—	III.
G ..	..	..	..	III.	III.	III.	III.	—	III.	—	IV.	IV.	IV.
H ..	..	..	..	..	..	..	..	..	III.	IV.	III.	—	IV.
I ..	—	III.	..	—	—	IV.	IV.	..	..	..	..	..	..
J ..	IV.	IV.	III.	..	—	—	—	—	IV.	IV.	..	..	..
K ..	..	..	..	..	..	..	..	III.	IV.	—	IV.	..	..

The Table shows that six nurses were fairly constant carriers of the Type III. pneumococcus for periods varying from 6 to 13 months. Carrier A proved to be a true persistent carrier in as much as the organism was isolated on every examination over a period of ten months. In Carrier B the organisms showed considerable intermittency during the first seven months of the inquiry, but were constantly recovered during the last six, while in Carrier F the Type III. pneumococcus was isolated in August, a Group IV. organism in September, and no other pneumococci were recovered until April, when the Type III. organism again appeared.

Summary

A study of the epidemiological characters of acute primary pneumonia in adults showed that the highest prevalence usually occurred in the spring months. In the selected healthy community under observation it was noted that the highest incidence of Group IV. pneumococci also occurred at that time of the year. In 1932 the occurrence of lobar pneumonia in epidemic form was more marked than in the years immediately preceding and was intimately associated with the incidence of acute primary *pneumonia* in children, to such an extent that it appeared that on each occasion the prevalence of lobar pneumonia was merely an incident in a respiratory epidemic. It is possible that the occurrence of influenza in the city provoked the second outbreak of lobar pneumonia, and it might seem as if epidemic outbreaks of the disease could coincide with the usual rise in the incidence of Group IV. pneumococci in the nasopharyngeal passages of the community, or develop *suddenly by reason of some powerful exciting influence,* as in this instance by the widespread occurrence of influenza. Furthermore, it would also seem more in accordance with the epidemiological evidence that the Types I. and II. organisms develop autogenously from the parasitic Group IV. pneumococci which normally inhabit the nasopharyngeal passages.

Although the case of lobar pneumonia was demonstrated to be a fertile source for the dissemination of the Type I. or II. pneumococci to healthy persons, yet a direct spread of infection seldom occurred and the carrier state was therefore regarded as a normal and generally harmless sequel, of little *consequence from a public health standpoint.* The Group IV. pneumococci were the dominant organisms in the community, but their incidence was subject to marked degrees of fluctuation, and in gauging their significance the employment of antisera for Types IV.–XXXII. was a most valuable aid. Regarding the Type III. pneumococcus it would appear as if it were really essentially saprophytic in character. *It occurred as a persistent parasite in 17 per cent.* of the persons examined, and its incidence appeared to bear no relation either to the individual case of pneumonia or to the general prevalence of the disease.

Conclusions

(1) Acute pneumonia due to pneumococci Types I. and II. is a disease which usually has its highest prevalence in the spring of the year. (2) In periods of epidemic prevalence there is, as a rule, evidence of increased *activity* among the Group IV. pneumococci. (3) The development of Types I. and II. pneumococci is autogenous in the vast majority of cases. (4) The Types I. and II. pneumococci seldom promote the spread of the disease by direct contact. (5) When responsible for a case of acute pneumonia, however, they readily spread to persons in contact and produce the carrier state. (6) Secondary contact *carriers are infrequent.* (7) Group IV. organisms are common organisms in the community. Their incidence is not constant but subject to a marked *degree of fluctuation.* (8) *The use of Group IV.* antisera for Types IV.–XXXII. is of considerable value in determining whether any one type is more prevalent or more fatal. (9) The Type III. pneumococcus is primarily saprophytic in character and in *the present inquiry was recovered from 17 per cent.* of the normal persons examined.

I desire gratefully to thank Dr. William Dow, medical superintendent of Knightswood Hospital, who afforded me every available facility and *encouragement.*

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[illegible] HOSPITAL.—Lord Wakefield [illegible] ation-stone of this new hospital [illegible] id gave a cheque for £1100 to complete the £10,200, which the building will cost. The institution, which will have 20 beds, will serve a population of 40,000. The equipment will cost a further £2000.

COMPENSATION FOR OCCUPATIONAL DISEASES

INTERNATIONAL ACTION

IN 1925 the International Labour Conference adopted a Convention providing for compensation for occupational diseases, the important proviso of which is that it shall be on the same basis as in national laws for accidents. A schedule of a few occupational diseases is a part of this Convention. The schedule is a very short one because great difficulty was experienced in arriving at agreement in regard to the basic principle of the Convention, and it was deemed wise to restrict the number of diseases inscribed on the schedule.

However, this conference passed a recommendation to the effect that its governing body should instruct the International Labour Office to continue its studies with a view to subsequent revision of the Convention by additions to the schedule. In the nine years which have elapsed since the adoption of the 1925 Convention the matter has been studied by the International Labour Office and its correspondence committee on hygiene, and the present conference had before it a proposal for a considerable extension of the schedule. In the first place the conference had to decide whether the partial revision of the Convention of 1925 was to be dealt with in toto at the present conference or whether the so-called "two reading" procedure should be followed. In this latter case, after discussing the general outline of the Convention, a questionnaire is prepared which is sent to the Member States for reply, and a final decision in regard to the Convention is taken at the following session. In this instance it would have been 1935. However, in spite of considerable opposition the conference decided to deal with the revision of the Convention in one reading.

The matter was then referred in accordance with the rules of procedure to a committee which, after sitting for over a week, recommended the extension of the schedule by the addition of the following occupational diseases:

Silicosis, with or without pulmonary tuberculosis; phosphorus poisoning; arsenic poisoning; poisoning by benzene, its homologues, and their nitro- and amido-derivatives; poisoning by the halogen derivatives of hydrocarbons of the aliphatic series; pathological manifestations due to radium, radio-active substances, and X rays; and primary epithelioma of the skin arising out of handling tar, pitch, and similar substances.

The principal difficulty in dealing with the draft Convention centred on the inscription of silicosis, and particularly on whether compensation should be paid for silicosis when tuberculosis coexists. A number of medical men, acting as expert advisers to certain national employers' associations, were on the committee, and these strongly urged the view that it is difficult to separate during life for assessment purposes the incapacity caused by silicosis from that caused by associated conditions, especially tuberculosis. It was stated that at least in Holland no tuberculosis was ever observed in association with silicosis, and on the other hand it was stated that certain forms of tuberculosis without any silicosis produced the same signs and symptoms as silicosis with tuberculosis. Various difficulties arising out of legal enactments in certain countries were also adduced in favour of providing compensation for silicosis only and not for the total incapacity arising out of silicosis with tuberculosis. Difficulties of administration in countries which allow the certification for compensation of incapacity or death by any registered practitioner were also urged against the inscription of silicosis, as it was considered—no doubt correctly—that the diagnosing of this condition can only be carried out satisfactorily by experts. However, in the end the committee adopted by a very large majority the following formula of inscription:

Silicosis with or without pulmonary tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.

The revision of the Convention as proposed by the committee was adopted by the conference by 78 votes against 8.

The committee also submitted to the conference for transmission to the governing body a series of five resolutions, the first four of which referred to silicosis. These resolutions can be briefly summarised as follows:

The states ratifying this Convention are recommended:

1. To establish a list of trades and industries in which there is a risk of contracting silicosis, giving due regard to the progress of scientific and clinical investigations into the ætiology of the disease.
2. To give attention to prophylactic measures, especially to the prevention of dust and the importance of preliminary and periodical examination of employees subjected to exposure to silica dust.
3. To entrust the diagnosis and certification of silicosis to medical men specially qualified for this work with facilities for adequate radiological examination, and to organise some suitable method of coördinating experiences concerning the carrying out of medical, radiological, and pathological examinations as well as the results of scientific investigations.
4. To institute special investigations regarding the incidence of silicosis and tuberculosis in the coal-mining industry.

The fifth resolution recommends the governing body to consider the inscription on the agenda of the 1935 conference the consideration of adding to the schedule ankylostomiasis, carbon disulphide poisoning, and such other occupational diseases as may be considered advisable.

MEDICINE AND THE LAW

Charge of Criminal Abortion: Effect of Previous Acquittal

William Maxwell, a herbalist, has given his name to a leading case in English criminal law. He was convicted at York assizes last February on two counts of an indictment charging him with (1) manslaughter of a woman whom he was treating as one of his patients, and (2) using upon her an instrument with intent to procure miscarriage. He was found guilty and was sentenced to 20 months' imprisonment. In criminal cases the English law shows special anxiety that the evidence laid before a jury shall be limited to the particular issue which it has to try. Except in specified exceptional circumstances the jurors must not be told that the accused has done (or is suspected of having done) the same thing before. Such information might persuade them into thinking that on that account he is likely to have been guilty in the case before them now. The more natural it would be for jurors to be so persuaded, the more assiduously does the law seek to exclude the risk of persuasion. Maxwell had not been previously convicted of criminal abortion or of any other crime. But he was tried seven years ago at Leeds for the manslaughter of a woman patient and was acquitted. This fact was brought out, as will presently be explained, at the trial at York. What effect would it have on a jury's mind? What effect ought acquittal to have on anyone's mind? These were the issues which the recent judgment in R. *v.* Maxwell had to decide. The jury at York last February was allowed by the trial judge to hear of the previous acquittal and to convict Maxwell. The Court of Criminal Appeal refused to interfere. The case was referred to the House of Lords by a rare exercise of the Attorney-General's power to certify a point of criminal law as of exceptional public importance. The House of Lords upset the conviction and ordered Maxwell's release.

THE FACTS AND THE STATUTORY POSITION

There is no need to elaborate the facts disclosed at Maxwell's trial. It was his case that, at the time of the seizure and collapse which immediately preceded his patient's death, he was in another room; he said he had not touched her on this occasion. The Lord Chancellor observed that the evidence against Maxwell at York was undeniably strong and some very damaging admissions had been made. These considerations, of course, made it more essential to give him all proper protection from injustice. The mention of the previous trial and acquittal in 1927 "might have been the last ounce which turned the scale against him."

The cross-examination of an accused person is governed by the Criminal Evidence Act, 1898, which enabled all accused persons to be witnesses in their own behalf. They received specific protection but there were certain conditions in which the protection might be forfeited. In the application of the Act to Maxwell's case the material words are those which enact that an accused person, giving evidence as a witness, "shall not be asked . . . any question tending to show that he has committed or been convicted of or been charged with any offence other than that wherewith he is then charged, or is of bad character, *unless* . . . he has given evidence of his own good character." At York the defence seems to have almost unnecessarily drawn attention to what had happened at Leeds. A witness for the Crown was cross-examined as follows: "Is it a fact within your own knowledge that a patient whom he was treating some years ago died during the treatment?" The answer was "Yes." Counsel for the prosecution then claimed the right to clear the matter up by asking "What happened to William Maxwell upon the death of his patient?" The judge disallowed the question in that form, but eventually the point arose again when Maxwell entered the witness-box. He told his counsel that he had had large numbers of women patients. "Have you ever been convicted of any offence in your life?" "No, I have lived a good, clean, moral life." This certainly amounted to "giving evidence of his own good character" within the meaning of the Criminal Evidence Act. It would have entitled the Crown to cross-examine Maxwell about his previous convictions but Maxwell had no previous convictions. The Crown elicited from him the fact of the previous trial and acquittal at Leeds in 1927, and the case proceeded with the result already stated. The Crown could argue that, by giving evidence of his own good character, Maxwell had thrown his statutory shield away and had exposed himself to a question whether, in the words of the Act, he had "been charged" with another offence. The Crown contended that, after the questions asked by the defence had elicited half the story, it was proper that the jury should hear the whole story.

LORD SANKEY ON THE EFFECT OF ACQUITTALS

The House of Lords answered these arguments by declaring that an acquittal nullifies a charge. Nobody would ever be able to clear his character if the fact that a prima facie charge had once been made against him were always to endure as a slur upon his reputation. The prosecution must not say that a man who has been acquitted can still remain under a cloud. If someone is charged before a magistrate and the prosecutor immediately admits that he has made a mistake, there is no slur; such an idea was "contrary to the whole idea of English jurisprudence." The mere fact of a charge "cannot in general be evidence of bad character or be regarded as other than a misfortune." The acquittal at Leeds in 1927 did not go to show that Maxwell must be guilty at York in 1934, or that Maxwell was an untrustworthy witness; it was therefore a quite irrelevant fact. Apart from the Criminal Evidence Act, irrelevant matters must be excluded because, if allowed, they were likely to lead the minds of the jury astray into false issues. Lord Sankey's judgment in R. *v.* Maxwell is a reminder that legal standards of probability are different from ordinary standards. The ordinary man, if selecting a confidential clerk or a domestic servant from a group of candidates, would probably avoid choosing one who had been previously convicted of dishonesty or who had even been suspected of dishonesty. In a court of law this consideration or prejudice must be rigidly excluded.

VITAMIN STANDARDISATION

SECOND INTERNATIONAL CONFERENCE

THIS conference, convened by the Health Section of the League of Nations, met on June 12th at the London School of Hygiene and Tropical Medicine. The personnel was almost the same as on the first conference in 1931, including Profs. Steenbock, von Euler, Poulssen, Jansen, Fridericia and Drummond, and Madame Randoin; new faces were those of Prof. Szent-Györgyi from Hungary, Dr. Nelson from U.S.A., and Prof. de Mattei from Italy. The absence of the German delegates was much regretted. The conference met under the chairmanship of Dr. E. Mellanby, F.R.S., and Miss Harriette Chick, D.Sc., and Dr. W. R. Aykroyd were, as before, the secretaries.

Sir GEORGE BUCHANAN, as a member of the Permanent Standards Commission, opened the conference and Sir HENRY DALE, F.R.S., representing the same body, followed with some words of general advice, applicable to all biological standards as well as to vitamins. He urged the conference to confine its official deliberations to the definition of standards and units and to avoid discussing methods of biological testing, which were the concern of the individual worker and did not demand international coöperation. Finally he begged the delegates, when they left the conference to return home, to give their fullest consideration to the actual means of implementing the decisions which they had just taken, for there existed no international machinery for imposing the use of the standards and units upon the governments, scientific workers, or industrial concerns of the various countries. Sir Henry Dale made the suggestion, in this connexion, that all those possessing editorial influence with any journal should bring pressure to bear on the editorial boards to refuse papers dealing with vitamins in which units other than international units are used.

The conference spent a part of its three days' life in plenary session, but for the larger part of the time it was broken up into four committees, each dealing with one of the vitamins A, C, D, and B_1, for which standards and units had already been set up in 1931. The work of the delegates was to consider how the standards and units which they had then established had worked in practice, and what changes ought to be made in response to the very considerable body of knowledge which had accumulated in the intervening three years. The reports on the working of the standards revealed few complaints, the only important one being connected with the use of crystalline carotene as the standard for vitamin A; workers complained that it offered difficulties in the actual mechanical handling. The advance of knowledge, however, revealed a number of points at which improvement might be made. Three of the vitamins, A, C, and D, had progressed into being more or less well-defined crystalline bodies, and the day was even dimly in sight where a biological test might be abandoned altogether, and a measurement of a chemical reaction or of a physical constant might take its place.

The actual decisions of the conference are best considered under the heads of the individual vitamins. The recommendations are embodied in a report which awaits the confirmation of the Permanent Commission on Biological Standardisation. The Permanent Commission meets later in the summer, and after its meeting the report will be published.

Vitamin A.—Knowledge of the chemistry of carotene has so progressed that pure β-carotene, of m.p. 184° C. (corr.) and optically inactive, was able to be recommended in place of the impure carotene, provisionally adopted before. The unit previously adopted was the biological activity of 1 γ of the standard carotene: β-carotene possesses greater biological activity than the old standard, and the amount of β-carotene which would provide a unit of the same size, that is to say, which possesses the same biological activity as 1 γ of the old standard, was fixed at 0·6 γ. Much work has been put into ascertaining a suitable solvent for administering the carotene to rats: in coconut oil, fulfilling certain tests, so satisfactory a solvent has been found that it was possible to recommend the distribution of the new β-carotene standard in solution, thereby obviating the difficulties encountered by workers in handling the crystalline material. A well-tried sample of cod-liver oil, whose potency in international units has been well established, was recommended for adoption as a subsidiary standard. Finally, a spectrophotometric test, measuring the coefficient of absorption at 328 mμ, was regarded in certain strictly defined circumstances as being a satisfactory measurement for vitamin A in liver oils and concentrates. A figure is given relating this measurement to the biological activity and thus, within a narrow sphere, the use of a biological test is eliminated.

Vitamin B_1.—The adsorbate on acid clay, previously adopted, has been found most satisfactory in practice; its further adoption was therefore recommended, together with the maintenance of the unit as then defined.

Vitamin C, like vitamin A, has progressed into the realm of pure substances: the lemon juice previously adopted as standard was therefore abandoned and pure *l*-ascorbic acid, as defined by a number of physical constants, was recommended in its stead. The unit was retained and 0·05 mg. of *l*-ascorbic acid was accepted as the equivalent in biological potency of 0·1 c.cm. of fresh lemon juice, whose biological activity was previously used as the unit.

Vitamin D.—The old standard material of irradiated ergosterol in olive oil solution was considered by all to have behaved well and there is still a large quantity of it available. It was not considered that there was any advantage to be gained at present by attempting to substitute crystalline vitamin D for it, but provision was made for such an ultimate change, when it should appear desirable. One very awkward set of facts, however, came to light in considering the standard for vitamin D. Research has recently been accumulating results which indicate that all animals do not utilise all antirachitic materials in the same relative proportion. Cod-liver oil, for instance, is much more potent as an antirachitic, relative to irradiated ergosterol, when it is tested on chicks than it is when tested on rats. Thus if a biological test of cod-liver oil as compared with the international standard irradiated ergosterol is made with chicks as the test animal, a much larger number of units of vitamin D will be attributed to the cod-liver oil than would be the case if the same comparison were made with rats. It is possible that other animals, pigs and man, are again different, and it is impossible, in the present imperfect state of knowledge, to avoid the major heresy in biological standardisation of defining the animal used for the test. Though it proved impracticable to obviate this difficulty completely, there is little doubt that further research will once more make generalisation possible.

Other vitamins.—The possibility of setting up pure lactoflavine as a standard for vitamin B_2 was canvassed, but it was generally felt that it would be premature to do so and that there were no practical arguments for haste, since deficiency of vitamin B_2 was not yet definitely linked up with any recognised syndrome of disease in man.

The conference was evidently a triumph of international coöperation; it created an atmosphere where only true facts could survive and where no element of individual or national self-interest crept in to mask the truth. In those circumstances an agreed set of recommendations was easily produced in the brief space of three days.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

DISCUSSIONS ON HEALTH INSURANCE

IN spite of official opposition on the part of the American Medical Association to any form of national health insurance, a certain ferment of inquiry is at work in many parts of the country. Less than a year ago (July 12th, 1933) a committee on survey of medical services and health agencies reported to the House of Delegates of the Michigan State Medical Society recommending the adoption of the principle of health insurance. The House of Delegates was not ready to accept this recommendation, but in January last sent Dr. Henry A. Luce, speaker of the House, and Dr. Nathan Sinai, chairman of the committee, to England to make a further study of the English system. These observers have made their report and the Michigan doctors are now committed to the principle of health insurance provided that its administration is under the control of the medical profession. A detailed plan will be submitted to the House of Delegates when it reassembles in the autumn. It is probable that this plan will provide for an administrative board of governors made up of three physicians, one dentist, one pharmacist, one nurse, one hospital superintendent, two representatives of industry, and two representatives of the general public. The politicians are not invited to participate. Fear of corruption through political control has been one of the main forces operating against health insurance in this country. The voluntarily insured family will be guaranteed free choice of physician.

In the meantime the West Coast has provided many private experiments in health insurance, some respectable, others not. In the State of Washington a large proportion of the medical profession is engaged in organised contract practice, and there is a feeling that a system of compulsory health insurance will be the outcome of the present trend. In California the majority of the profession is opposed to health insurance, but there is an important minority with many lay sympathisers. At the 1934 meeting of the California State Medical Association a State-wide plan for providing hospital service in return for periodic payments failed to secure a necessary two-thirds majority. Dr. Rodney, spokesman for the opposition, is an ardent advocate of compulsory health insurance. It was, as you have already noted,[1] in the lively atmosphere of California that Mr. John Kingsbury, co-author with Sir Arthur Newsholme of "Red Medicine," and director of the Milbank Memorial Fund, recently launched his proposal for meeting the present problem of the costs of medical care.

The basic problem, says Mr. Kingsbury, is this: the costs of medical care are incurred in a haphazard, uncertain, and unbudgetable way. And the underlying cause is the fee-for-service purchase of medical service. He agrees with Sir Arthur Newsholme that the health of every individual is a social concern and responsibility, and that medical care in its widest sense for every individual is an essential condition of maximum efficiency and happiness in a civilised community. After discussing the history of insurance in Europe and in America Mr. Kingsbury comes to "tentative conclusions" based upon the incomplete report of Dr. I. S. Falk and Mr. Edgar Sydenstricker and upon his own studies. An insurance plan should not aim primarily to furnish financial assistance to the poor, but to enable all who cannot afford to pay for adequate medical service as individuals to purchase it as groups. The plan should therefore care for all who have incomes up to $3000 or even $5000. However, the plan must include the very poor who are slow to come into a voluntary system. Insurance should therefore be compulsory. European experience shows clearly that schemes which are voluntary at first eventually become compulsory. Cash benefits should not be included in a health insurance scheme. The cost of adequate service is estimated at $36 per person annually. This includes specialist and nursing care, dental care, in-patient treatment when needed, drugs, and medicine; also institutional care for mental disease and tuberculosis. Medical services of the kinds which are ordinarily purchased privately would cost about $27 per person. Administrative control is given to the laity for financial and executive problems, and to the profession for control of professional problems. Mr. Kingsbury holds that European systems of insurance have never dealt adequately with preventive care. Provision in his scheme is made for periodic medical examinations, immunisations, prenatal and postnatal care. The present is a favourable opportunity for the consideration of all these matters in California, as the State Senate have just appointed a committee to investigate the high costs of sickness.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE IRISH MEDICAL ASSOCIATION

THE annual meeting of the Irish Medical Association was held in the Royal College of Surgeons, Dublin, on June 26th, under the presidency of Dr. Robert J. Rowlette. For the first time in its history the programme of the meeting included a scientific session. Two discussions had been arranged—on the modern treatment of pulmonary tuberculosis, and the relations of the medical officer of health and the general profession. Dr. E. T. Freeman gave a careful account of the gold treatment of pulmonary tuberculosis and of the parts that the various surgical procedures—artificial pneumothorax, phrenicectomy, thoracoplasty—play in treatment. He was followed by Dr. J. T. Daniel, tuberculosis officer of the city of Dublin, who gave a survey of the present-day lines of treatment, without confining himself to the newer methods. He stressed the important place in treatment that must be taken by rest, fresh air, diet, and hygienic surroundings and habits of life. Others who took part in the discussion were Dr. John Shanley, Dr. J. C. Flood, Dr. A. J. d'Abreu, and the president. Dr. J. A. Harbison, medical officer of health for County Dublin, opened the second discussion, and surveyed the respective spheres of action of the medical officers of health and the general practitioners. He was followed by two other county medical officers of health, Dr. J. A. Musgrave, of Louth, and Dr. T. J. R. Maguire, of Roscommon, and by Dr. T. P. McDonnell and Dr. T. F. Armstrong, who spoke from the point of view of the general practitioner.

In the afternoon the business session of the Association was held. Dr. Rowlette and Mr. H. F. MacAuley were declared re-elected as president and vice-president respectively, and the names of those elected to the council were read out. The annual report states that the membership during the year 1933 had increased from 339 to 365. Six members had died, 14 had resigned, and 27 had been removed from the list for non-payment of subscriptions; 73 new members had been elected. During the year a joint council with the Irish committee of the British Medical Committee had been formed—the General Council of Medical Associations—and this body was authorised by the Irish Medical Committee to act for the profession as its executive in representations to Government departments. The finances of the Association were satisfactory. Dr. Thomas Gillman Moorhead was elected an honorary member of the Association.

An account of conversations between the B.M.A. and the Irish Medical Association with a view to amalgamation as far as members resident in the Irish Free State were concerned was given by Mr. MacAuley, vice-president. The meeting expressed its approval of the steps that had been taken and authorised the continuance of conversations on the same lines.

In the evening the members dined together and entertained a number of guests at the Dolphin Hotel. No annual dinner had been held since 1914. The guests included Mr. Sean T. O'Kelly, vice-president of the Executive Council of the Irish Free State and Minister for Local Government and Public Health; the Lord Mayor of Dublin; the Attorney-General; Dr. Moorhead, president of the B.M.A.; and Mr. Doran, chairman of the Irish Hospitals Commission.

KING'S PROFESSOR OF THE PRACTICE OF MEDICINE

The President and Fellows of the Royal College of Physicians of Ireland have elected Dr. Victor Millington Synge to the King's professorship of the practice of medicine in the School of Physic in Ireland, Trinity College, Dublin, vacant by the death of Dr. F. C. Purser. Dr. Synge has been for several years one of the visiting physicians to the Royal City of Dublin Hospital. It will be remembered that Dr. Purser had only held the office two months when his sudden death occurred.

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[1] THE LANCET, April 28th, p. 904.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

WORK FOR THE DEAF AND BLIND

The Scottish Association for the Deaf have opened a boot-repairing factory in Glasgow, which is the first of its kind in Scotland. The factory is equipped with modern plant, and an instructor foreman has been appointed. There is accommodation for about 24 workers, most of whom will be deaf. Sir Robert Wilson, chairman of the association, in opening the factory, spoke of the difficulty in obtaining positions for the deaf when they left school, as employers feared that their handicap might increase the number of accidents. Dr. James Kerr Love, vice-president, said that during the last 40 years the percentage of acquired deafness among school-children had been reduced by half, which he attributed to better attention in hospitals and the work that was being done among school-children. He believed that at present the powers of the local authorities were not being fully used.

At the recent Aberdeen conference the capacity of the blind to learn salesmanship was discussed. It was admitted that though successful selling schemes for disposing of the work of the blind have been organised by all the societies of Scotland, most of the centres could give instances of blind people who had failed to earn their own living as salesmen. It was thought this was probably due to lack of enterprise and proper training. Modern business methods should be made available to the blind by means of braille price tabs and receipt slips and so forth. In spite of differences of opinion as to how far it was practicable to teach the blind salesmanship it was felt that the idea should be systematically tried. The blind tea-merchant has long been a familiar figure in Scotland, and though the sale of other merchandise —notably their own handiwork—is more complicated, a strong interest in the possibilities of this type of work for the blind was shown at the conference.

SHEFFIELD RADIUM CENTRE

DEPARTMENT FOR DEEP X RAY THERAPY

This department, which has been in use for some months, was to have been opened by the Duke of York on July 5th, but the engagement had to be cancelled on his doctors' orders. The apparatus for high voltage X ray therapy has been especially designed and incorporates the latest advances. It is, moreover, so designed that if the X ray tube suffers from a broken or worn out filament, or if the anode requires adjustment, the tube can be taken to pieces and put together again with little trouble and at very small cost, and routine work can be resumed within an hour or two. The Greinacher high tension circuit has one end earthed and supplies two tubes at 200 kv. and 10 m.a. each. The current is rectified by continuously evacuated valves and then smoothed by condensers. The group of research workers of Metropolitan Vickers, the makers of the apparatus, described its advantages in the February issue of the *British Journal of Radiology.*

The necessary vacuum in both the X ray tubes and the continuously evacuated rectifiers is maintained by means of oil diffusion pumps, in action during all the time when the apparatus is in use, and the tube is sealed by the apposition of surfaces ground optically flat to within one or two wave-lengths of light. The anticathode in each tube is hollow and the surface emitting X rays is of gold. Inside the hollow anticathode water is circulated from the mains for cooling.

From the medical point of view we understand that the apparatus has so far been very satisfactory. The movements of the tube are similar to the well-known Holfelder Cannon. The whole tubes can move bodily up or down and the X ray beam can be used in any direction with the exception of an angle of 30 degrees which is blind because the water-cooling tubes cross the path of the beam. One tube has already been used for some 2000 hours and the routine work has been in progress all the time with only a few minor interruptions. The actual time of emission of X rays has been about 1000 hours. The number of patients treated (mostly by fractionation techniques) was 160 by the end of January—i.e., after three months' work. In addition, many hours have been spent in making physical measurements.

The apparatus is controlled by a staff nurse with no previous radiological training and all fields are arranged by a medical officer.

BRITISH HEALTH RESORTS ASSOCIATION

NORFOLK COAST CONFERENCE

The conference which took place on June 30th was the first to be held on the East coast.

Dr. Burton-Fanning (Norwich) presided at the morning session at Sheringham, and a summary of the aims and objects of the association was given by its founder, Lieut.-Colonel R. H. Elliot.

Dr. R. A. Young (London) then opened a discussion on

THE SEASIDE RESORT IN THE TREATMENT OF RESPIRATORY DISEASES

by quoting the words of Dr. Ellsworth Huntington (U.S.A.): "The climate found on the shores of the North Sea is the best in the world for human health and activity." Great Britain, Dr. Young continued, offered health resorts suitable, if chosen with discretion, for practically all the ills to which her islanders were subject. It was essential, however, if we were to make the best of our resources, that the indications and contra-indications of each resort and any seasonal limitations it might have should be better understood; nor must the effect of environment be ignored.

The coast and hinterland of Norfolk was rich in all the factors, climatic and environmental, that tend to stimulate, and its effect in those cases of respiratory disease which were capable of reaction to stimulating influences was almost magical.

Dr. L. S. T. Burrell (London) stressed the importance of putting the individuality of the patient even before the nature of his malady in selecting the health resort. The factor of peculiar value from the point of view of health in the English climate was its variability. Only in rare cases—where the mental make-up of the patient was such as to be impressed by foreign surroundings—had he ever known greater improvement to occur abroad than at one of the health resorts at home.

Dr. Andrew Morland (Mundesley Sanatorium) said that the dryness and freedom from fog of the East coast, together with the absence of extremes of summer heat or winter cold, made it an ideal all-the-year-round resort for the convalescent from acute respiratory disease. For those whose nutritive powers were inefficient some protection was necessary during the colder winter months. For this and other reasons he advocated sanatorium treatment for the consumptive. Though in its stimulating character the climate of the coast was comparable with that in the Alps, it had not the disadvantage of increasing depth and rate of respiration and of pulse-rate that were sometimes associated with high altitudes. Moreover, the important question of diet was much more satisfactorily arranged at home where plenty of fresh milk and vegetables were available. There was a certain robust type of consumptive, capable of rapid reaction, whose progress could be expedited by wintering in Switzerland, but the large majority made just as good if not better progress at sanatoria at home. Dr. Morland illustrated his thesis by graphs, one showing that the mortality rate from phthisis was appreciably less in countries bordering on the North Sea than elsewhere on the continent, and another that the gain in weight showed less seasonable variation in England than abroad. As regards seekers after health in general, Dr. Morland considered that one of the chief factors inducing people to go abroad was the irritating restrictions of D.O.R.A. at home resorts.

Dr. Valentine Blake (Great Yarmouth), president of the Norfolk and Norwich Medico-Chirurgical Society, presided at the afternoon session held at Cromer.

Climatic Factors in Treatment

Dr. Fortescue Fox (London) opened a discussion on "Climatic and allied factors in the incidence and treatment of disease, with special reference to the coast of East Anglia." He said that the invigorating climate of the coast, due to a remarkable combination of warm sunshine and cool air-currents, was in his opinion a great national asset. Too little attention had been paid in the past to the study of climate, and he pleaded for systematised observation and the collection of data by medical men practising in the coastal resorts, so that the matter could be placed on a more scientific basis.

Dr. S. H. Long (Norwich) referred to the Norfolk and Norwich Hospital's convalescent home at Cromer, and said that over a period of 25 years the rapidity and degree of improvement of the patients sent to the coast had been remarkable; the home was in constant use except for a period of six weeks in the winter.

Dr. W. J. Pearson (London) also stressed the immediate nature of the response shown by the debilitated to the tonic effects of the Norfolk climate. While it was true that in adults certain diseases either in themselves called for sedative treatment or resulted in so much pathological change as to render their victims incapable of reaction, this was rarely if ever the case in children. It followed that if the coast was too stimulating for adults in some circumstances, for children no better climate could be found.

Mr. L. C. W. Bonacina, F.R.Met.S., said there was a great deal of public misconception about the coast, particularly as regards its winter climate, owing to the false association of East coast with East winds. The Norfolk coast got no larger share of East winds than the country generally, for they blew with equal frequency elsewhere; neither was the direction of the wind the deciding factor in its pleasantness or the reverse. The temperature of a wind approaching England from the continent of Europe might be raised ten degrees by its passage across the Channel or the North Sea. On the contrary, a south-west wind reaching the East coast across a snowclad England might be distinctly colder. Taking the year round, wind, sunshine and vapour-pressure—the climatic factors that mattered most for health—were ideally blended on the coast of Norfolk.

Among the other speakers in the morning or afternoon were Sir Holburt Waring, Prof. Langdon Brown, Sir Stanley Woodwark, Drs. Leonard Findlay, Howard Humphris, M. B. Ray and J. B. Alexander, of London, and a number of Norfolk practitioners. The discussions were remarkable for their frankness and unanimity, especially regarding the contra-indications of the coast. As might be expected, these are illnesses of a type which at home would be treated on sedative lines, such as borderline mental cases, asthmatics of the type in whom the predominant factor is probably nervous, sufferers from migraine and epilepsy, those with hyperarterial tension, and elderly bronchitics with cardiac failure.

The members of the conference were received by the vice-chairman of the Cromer Urban District Council on the evening of their arrival, and entertained at dinner on Saturday evening, when Lord Meston was the principal guest. They were also entertained by the Sheringham Urban District Council to luncheon on Saturday, while Sunday was devoted to motor excursions along the coast.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Rear Admiral R. W. B. Hall, C.B., O.B.E., has taken up his duties as Director-General of the Medical Department of the Navy in succession to Sir Reginald St. G. S. Bond, K.C.B.

The following appointments have been notified:—

Surg. Comdr. A. W. Gunn to *Sussex* on recommg.

Surg. Lts. J. G. Slimon to *Vernon*; D. D. Steele-Perkins to *Gnat*; A. D. Hepburn to *Victory*, for R.N.B.; S. H. R. Price to *Victory* for R.N.B., Portsmouth, and to Exeter; H. E. B. Curjel to *Drake* for R.N.B., Devonport; H. A. Clarke to *Victory* for R.N.B., Portsmouth; and F. H. Ward to *Sussex* on recommg.

Surg. Lt. (Short Service) C. D. D. de Labilliere transferred to Permanent List.

ROYAL ARMY MEDICAL CORPS.

Capt. D. K. Weston relinquishes his commn.

Short service commission.—The undermentioned to be Lts. on Prob.: W. M. E. Anderson, H. B. Wright, J. Boyle, R. H. Foster, J. S. Ruddell, A. G. D. Whyte (from R.A.M.C., T.A., Supern, for serv. with the O.T.C.), A. L. Pennefather, C. G. O'Driscoll, D. T. Swift, F. E. Buckland, A. MacLennan, J. H. J. Crosse, J. Morgan, R. A. Stephen, E. H. P. Lassen, R. S. Vine, I. Buchanan, J. E. Jameson, M. W. Allen, W. T. Bermingham, and K. H. Clark.

The undermentioned Lts. on prob. are secd.: A. G. D. Whyte, C. G. O'Driscoll, A. MacLennan, J. Morgan, R. A. Stephen, K. H. Clark, and M. J. Horgan.

ARMY RESERVE OF OFFICERS

C. M. Fraser to be Lt.

TERRITORIAL ARMY

Capt. A. H. G. Down resigns his commn.

Lts. L. F. Richmond and N. H. Leslie to be Capts.

D. S. Anderson (late Offr. Cadet, St. Andrews Univ. Contgt., Sen. Div., O.T.C.) and A. D. Forgie to be Lts.

The King has conferred the Efficiency Decoration upon Maj. R. J. Bruce.

TERRITORIAL ARMY RESERVE OF OFFICERS

Lt.-Col. and Bt.-Col. J. W. Keay, Lt.-Col. J. H. Stephen and Maj. J. A. Morris, having attained the age limit retire and retain their rank, with permission to wear the prescribed uniform.

INDIAN MEDICAL SERVICE

Majs. to be Lt.-Cols.: B. Z. Shah, V. R. Mirajkar, A. J. D'Souza, B. C. Ashton, M. M. Khan, E. R. Daboo, and B. G. Mallya.

Capts. to be Majs.: F. R. W. K. Allen, M. Taylor, and W. Lawie.

Temp Lts. to be temp Capts.: S. S. Ahluwalia, M. Singh, and P. Papatla.

It is announced that Surgeon Rear-Admiral R. W. B. Hall and Surgeon Rear-Admiral W. W. Keir have been appointed Honorary Physician and Honorary Surgeon respectively to the King.

PANEL AND CONTRACT PRACTICE

AN OPENING FOR INJUSTICE

CONSIDERING how easy it is for a patient, or relative of a patient, to bring a charge against an insurance practitioner—involving, perhaps, professional honour, or even veracity—the exact means by which justice is administered are of no little importance.

It is obviously fair and right that any adult patient should be able to send a complaint to the clerk of the insurance committee (which is responsible for the administration of medical benefit) if he thinks that his doctor has done something he ought not to have done, or left undone something that he ought to have done. The procedure in this case is for the clerk to forward relevant extracts from the letter of complaint, or possibly the whole letter, to the practitioner concerned and to ask for his observations. These observations, or extracts from them, are sent to the insured person, whose further comment is invited. If this in turn contains anything which is thought to be important for the practitioner to know it is forwarded to him. The whole correspondence, verbatim, is then circulated to the members of the medical service subcommittee. (This consists of an equal number of lay persons who represent approved societies or insured persons and of medical men who represent the panel committee and the local medical committee—which in these days often have the same personnel. There is an independent chairman usually appointed from the neutral members of the insurance committee—i.e., from those representing the county council or the Ministry of Health.) The medical service subcommittee decides whether a hearing is necessary and, if so, arranges the time and place. Finally, having heard the case, it decides whether there has been a breach of the regulations; whether, if so, there should be a caution or censure; and whether money ought to be withheld from the practitioner's remuneration, and, if so, how much. Its decision is usually confirmed by the full insurance committee, but must also be confirmed by the Ministry of Health. Either party can appeal to the Ministry when the case is reheard de novo.

There is little to complain of in this procedure, for the members of the committee are not likely to know anything about the complainant or the doctor personally and justice can be correspondingly impartial.

It sometimes happens that the insured person does not want to make a complaint, but a relative does. If on the correspondence it appears to the medical service subcommittee that the complaint is one that ought to be investigated in spite of the insured person's refusal to complain, they have the power to advise either the medical benefit subcommittee or the main committee that this is a matter which requires investigation. Thereupon a resolution is passed by one of these committees "that the matter be referred to the medical service subcommittee for investigation." This procedure is called "getting a reference." The insurance committee (or its medical benefit subcommittee) is becoming the complainant, before one of its own statutory subcommittees, against a particular practitioner.

In these circumstances it may easily happen that some of the lay members of the medical service subcommittee—those representing either insured persons or approved societies—were present at the meeting at which the reference was passed. This hardly appears fair from the point of view of administration of justice, for a complainant can hardly act with equity as accuser and judge. On the other hand, the practitioner may rely upon the support of his professional brothers, for these are not likely to have been involved in getting the reference. The position is reversed, however, under Article 32 (2) of the Medical Benefit Consolidation Regulations, 1928, which not only gives a panel committee power to send a case to the insurance committee for investigation, but also provides that the insurance committee must in this case investigate. The only tribunal for this investigation is the medical service subcommittee, and this includes several members of the panel committee, all of whom have been steeped in the details which have resulted in the panel committee deciding for a reference. What confidence will the practitioner have in the impartiality of his tribunal when his professional brothers on it belong to the body which has instituted the proceedings against him; and what hope is there of the laymen on that tribunal supporting him against the advice (as he will think) of their professional colleagues—who now represent his accusers?

The particulars of a recent case have been published for all and sundry to know. Dr. A. made a complaint to the London panel committee that Dr. B. had tried to secure the transfer of insured persons to his list. The case was heard in the usual way by the attendance of both doctors before the ethical subcommittee, where Dr. A. submitted six signed statements from patients all alleging persuasion by Dr. B. to join his panel. Dr. B. tried to refute the allegations, but there was no opportunity of examining the people who wrote the letters, since they were not present. At the subcommittee meeting, nevertheless, the allegation was held to be proved. The subcommittee took a serious view of the case and decided to ask the full panel committee to take proceedings under clause 44 of the Medical Benefit Regulations, whereby they are empowered to make representations to the Minister that the continuance on the medical list of the practitioner would be prejudicial to the efficiency of the service. When this request came before the full committee it was said quite plainly that if the case was one of canvassing the General Medical Council should deal with it. If it was only a question of removal from the panel then the proper action was to refer it to the medical service subcommittee. The point here is that there was so much discussion of the case that no one present could fail to be impressed with the opinion of Dr. B. which had been formed by the subcommittee.

Solicitors were instructed to take steps to carry out the committee's resolution and to begin proceedings with a view to the removal of the practitioner's name from the medical list. The solicitors, however, at once realised the difficulty and reported their opinion that unless the committee got further and stronger evidence their case would be unsuccessful. The subcommittee thereupon instructed them to proceed with the collection of further evidence. The solicitors did so; and their comments on the statements obtained from six witnesses were as follows: (A) and (B) were vague and would not stand up to the cross-examination. (C) Actually asked to be transferred. (D) A good witness, but would not have written had he known that there would have been any trouble; therefore doubtful strength. (E) Doctor against whom complaint was made was specially sent for and there was no mistake.

(F) This patient was told the doctor he wanted to see was Dr. A. In view of this report the subcommittee decided *not* to try to get Dr. B. removed from the panel; but as in the course of the investigations it had been discovered that he gave some of these insured persons who are not on his list medicine by prescription on the official form and on one occasion a certificate without seeing the patient, it asked the panel committee to refer the case to the medical service subcommittee for investigation. This will require the consent of the Minister of Health, for it is technically out of time owing to the delay involved in the investigation by the panel committee. The panel committee passed the reference, so that, subject to the Minister's consent, it now goes to the insurance committee. If the Minister does give consent then three of the seven men who will have to hear this case will have been familiar with the details of the complaint from its commencement, and if they are the normal medical members of that subcommittee one of them was actually present at the original inquiry whilst another in his capacity of chairman of the main committee cannot fail to have all the details of the case at his fingers' ends.

There is obviously something wrong in the administration of justice to insurance practitioners as instanced in this case. The decision of the ethical subcommittee that this man was guilty of canvassing, for which the panel committee must accept full responsibility, was based on evidence which was proved insufficient. The panel committee's decision to make representations to the Minister with a view to the withdrawal of the practitioner's name from the medical list, had therefore to be rescinded. Instead of then letting the matter drop, the panel committee decided to put this doctor on trial again on a minor charge before a tribunal in which its own members have to adjudicate and decide the penalty, if any.

The function of the panel committee (through its ethical subcommittee) should be to try and effect a friendly settlement between two doctors who are in dispute. When evidence is given that something quite serious has occurred the matter should be referred, without details being published, to the proper tribunal for the hearing of such cases, either the General Medical Council or the Ministry of Health or the medical service subcommittee. No officers of the committee (since they are ex-officio members of all subcommittees), and no members of the ethical committee should be eligible to sit as medical members of the medical service subcommittee. The ethical subcommittee has no statutory power to call evidence, it cannot pay the out-of-pocket expenses of witnesses, and by its size also it is quite unsuitable to deal with this sort of case. It appears to have been overlooked in the regulations under which the panel committee can refer cases to the medical service subcommittee for trial that its own members sit upon that subcommittee and may have taken part (as in the present case) in adjudicating upon the case previously. This seems to be a more glaring anomaly than the former method of reference by the insurance committee to its own subcommittee.

One way of getting over the reference difficulty would be to send the case to another medical service subcommittee, where, of course, no one would have had any previous details that might possibly prejudice their minds. It is clear that under the present procedure the administration of justice to an insurance practitioner may not be conducted in the proper atmosphere of impartiality.

CORRESPONDENCE

BRITISH HEALTH RESORTS ASSOCIATION

To the Editor of THE LANCET

SIR,—We have been much encouraged of late by the increasing interest shown in the work of the British Health Resorts Association by the medical profession. Our association is largely medical, not only in personnel but in its objects, which are to awaken and sustain interest in the health side of our British resorts. At our recent conferences at Harrogate and Cromer we were supported by leaders of the profession, and I venture to think that the quality of the discussions was something of which we may be proud.

Though we look in the main for financial support to the local authorities of the places we are trying to help, we are very anxious to secure more of it from the medical profession, particularly from those members practising in the health resorts or who take a special interest in climatology, balneology, and physical medicine. The recent action of the Harrogate Medical Society and the Torquay division of the B.M.A. has therefore given our council great pleasure. These bodies have circularised their members with a view to enlisting their interest in our work, and by this means we have secured a considerable number of new members. Our medical advisory committee would be glad to have an opportunity in your columns of bringing these examples to the notice of similar bodies, in the hope that they may do likewise.

Our subscription is £1 1s. a year, though we would welcome any donations, small or large. We cannot offer any direct material advantage to subscribers, but we believe there are many who would be willing to show a practical interest in a movement which has a distinctly medical as well as a patriotic aim. I shall be glad to answer any inquiries.

I am, Sir, yours faithfully,

ALFRED COX,
General Secretary.

199, Piccadilly, W., July 2nd.

JOINT LUBRICATION

To the Editor of THE LANCET

SIR,—In your last issue Dr. Shirley Jones has called attention to the importance of the viscosity of synovial fluid in relation to joint lubrication, and has inferred that certain forms of arthritis may be due to alterations in the mucin content of this fluid. Very little is known about the physiology of the mucoproteins, but it does seem fairly clear that the thyroid gland is concerned. Thus in myxœdema there is a generalised accumulation in the tissues of a colloid which is, or closely resembles, a mucoprotein, and it is also known that the secretion of the parotid gland in this disease assumes an abnormally mucoid character. Since this plethora of mucoprotein is readily corrected by thyroxine it might be anticipated that the opposite condition of hyperthyroidism would be accompanied by a paucity of mucin in the tissues, and if the synovial fluids share in these general changes, then arthritis, from defective lubrication, should be commonly encountered in Graves's disease. It is rather suggestive that S. Duncan (Jour. Amer. Med. Assoc., 1932, xcix, 1239) and others regard polyarthritis as a common complication of this disease. My argument is somewhat weakened by the fact that joint troubles are not uncommon in myxœdema. However, cartilage is very prone to undergo mucoid degeneration and perhaps the arthopathy of myxœdema may be due to degenerative softening of articular cartilage.

I am well aware of the perils of drawing conclusions from circumstantial evidence, and I am not rash enough to suggest that the thyroid plays more than a small part in the pathogenesis of arthritis as a whole. But it seems to me that direct measurements of the effect of thyroxine on the viscosity and mucin content of synovial fluid might yield useful information. I am, Sir, yours faithfully,

F. B. BYROM.

London Hospital, July 3rd.

HOOKWORM IN GOLD-MINES

To the Editor of THE LANCET

SIR,—In the current issue of THE LANCET there is a leader on Hookworm in Gold-mines, based on a paper by J. H. Hodgman, to which I am, somewhat reluctantly, bound to refer.

I have been intimately concerned with the hookworm problem on the mines referred to, and have no knowledge of a "J. H. Hodgman" ever taking an important part in this work. Presumably, therefore, he writes from second-hand knowledge, and, like most knowledge so acquired, his information is decidedly inaccurate. Within the scope of a letter it is impossible to deal with the matter fully, and I will therefore draw attention only to outstanding errors:—

(1) In 20 years' work on the gold-mines I have never seen cockroaches in any notable numbers underground.

(2) Although it was suggested that viable ova may pass through rats, repeated experiments with rats caught underground failed to confirm the suggestion.

(3) It is true that about 40 per cent. of *East Coast* natives arrive on the mines infected with hookworms, but these constitute less than *one-third* of the present labour force. Among [illegible] thirds infection is rare.

(4) The infection rate *decreases* with residence on the mines, although no mass treatment is undertaken.

(5) It is the grossest possible exaggeration to describe the latrine conditions as appalling. I say this on the ground of personal knowledge which is as wide and intimate as anyone's could be.

I am, Sir, yours faithfully,

A. J. ORENSTEIN,
Chief Medical Officer, Central Mining; Rand Mines.

Weymouth-street, W., June 30th.

LECTURES AND PAMPHLETS ON MENTAL HYGIENE

To the Editor of THE LANCET

SIR,—I have just finished reading the challenging article of Dr. Edward Mapother in your issue of May 26th, and am astounded at his concluding sentence.

> As to the giving of collective counsel upon details of mental hygiene directly to the public by lectures and pamphlets (as opposed to urging resort to expert advice), in view of all the possibilities of misunderstanding and misapplication, it seems to me likely that on the whole this will do more harm than good.

Earlier in the lecture Dr. Mapother writes (regarding sex experience and sex education):

> "The first general prophylactics needed are the steady growth of a morality that is rational rather than traditional, honesty among adults, and proper education of the child."

If lectures and pamphlets do more harm than good how does he propose to apply, for example, the above excellent prophylactics? Does he condemn all pamphlets? Specifically, would he condemn this booklet issued by the U.S. Children's Bureau: "Are you training your child to be happy"? Or does he really mean that there are some pamphlets and some lecturers that do more harm than good? One can easily agree to that. Indeed, how else has our traditional morality been popularised?

I am, Sir, yours faithfully,

Santa Va., N.M., June 17th. ROSSLYN EARP.

PUBLIC HEALTH

The Infectious Stranger

IT is the duty of local authorities to provide hospital treatment for the infectious diseases of inhabitants of their own area, but apparently they have no such legal obligation as regards visitors who normally live elsewhere. Similarly, they are not obliged to arrange or pay for the care of those of their own residents who develop infectious diseases while staying in some other district. Thus no one is really responsible for patients who are unwise enough to fall ill while absent from their own locality, and, as one might expect, there have been cases in which a good deal of trouble has arisen from authorities disclaiming responsibility and sending infectious patients back to the reluctant care of the bodies under whose auspices they ordinarily dwell. It is to obviate any further disputes of this kind that the Minister of Health has now issued the Public Health (Treatment of Infectious Diseases) Regulations, 1934. In an accompanying memorandum it is pointed out that the primary public purpose of the hospital treatment of infectious disease is to prevent the spread of infection, and as the population exposed to the risk is the population of the area in which the disease is discovered, "it is generall recognised that the proper course is for the authorit of that district . . . to provide the necessary trea ment." To send people back to their homes when the clearly require hospital care is detrimental to publ health both by delaying treatment and riski dissemination. The regulations accordingly provi that authorities shall have the same powers and dut (in relation to the provisions of hospitals, &c.) respect of strangers as in respect of their o inhabitants. This will not, of course, affect right of an authority to decide on the advice of medical officer what cases shall be treated in hospi but it is intended to secure that the decision shal based on medical considerations alone, with a to the most effective control of the disease and best use of the accommodation available.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK E
JUNE 23RD, 1934

Notifications.—The following cases of infe disease were notified during the week: Small-p (last week 3); scarlet fever, 2363; diphtheria, enteric fever, 17; acute pneumonia (prima erperal fever, 43; puerperal yrexia, 118; cerebro-spinal fever, 20; acute poliomyelitis, 6; acute polio-encephalitis, 3; encephalitis lethargica, 6; dysentery, 14; ophthalmia neonatorum, 81. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 2nd–3rd was as follows: Small-pox, 3 under treatment, 1 under observation (last week 5 and 0 respectively); scarlet fever, 1615; diphtheria, 1588; measles, 1331 (last week 1547); whooping-cough, 282; puerperal fever, 25 mothers (plus 8 babies); encephalitis lethargica, 268; poliomyelitis, 2; "other diseases," 208. At St. Margaret's Hospital there were 15 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there were no deaths from small-pox or enteric fever, 23 (5) from measles, 6 (1) from scarlet fever, 33 (3) from whooping-cough, 30 (9) from diphtheria, 27 (8) from diarrhœa and enteritis under two years, and 24 (5) from influenza. The figures in parentheses are those for London itself.

Four of the deaths from measles were in Gateshead and 3 in Sheffield. Four fatal cases of whooping-cough were reported from Liverpool. There were 7 deaths from diphtheria in Leeds and 3 in Liverpool. Influenza was given as the cause of 4 deaths in Manchester, and 4 of the fatal cases of diarrhœa and enteritis were in Birmingham.

The number of stillbirths registered during the week was 260 (corresponding to a rate of 40 per 1000 total births), including 37 in London.

OBITUARY

ARTHUR BERNARD CRIDLAND, F.R.C.S. Edin.

CONSULTING OPHTHALMIC SURGEON, ROYAL HOSPITAL, WOLVERHAMPTON

We regret to announce the death of Mr. Bernard Cridland, which occurred on June 29th at Salisbury House, Wolverhampton.

MR. CRIDLAND

[Photograph by Bennett Clark

Arthur Bernard Cridland was born in Bristol and educated at Clifton College and University College, London, proceeding for his medical training to St. Mary's Hospital. He took the English double diploma in 1898 and proceeded a few years later to the F.R.C.S. Edin., and at the beginning of his career manifested the direction which his professional activities would follow, becoming at once house surgeon to the Bristol Eye Hospital and, later, anæsthetist with charge of the ophthalmic wards at the Royal Infirmary, Bristol. He then commenced his long association with Wolverhampton, where he was pointed ophthalmic surgeon to the Royal Hospital d to the Wolverhampton and Midland Counties e Infirmary. The skill and assiduity of his work de an early mark, and he soon gained a large ctice and became recognised as an authority on effects and treatment of injuries of the eye as erved in a large industrial town. He was mainly rumental in bringing the tonometer into regular in England. His special qualities were much by the fact that he was a thoroughly sound und surgeon. He now made a position in the almological world through his association with ruitful labours carried on at Oxford, and testified y the success of the annual ophthalmological ess in that city. This association commenced 10, when he took the D.O. Oxford diploma, n 1914, in succession to the late Sydney enson, he became secretary to the Congress. ties in connexion with this post he discharged years, and it is generally admitted that the importance and popularity of these annual meetings is mainly due to Cridland's effective and continuous work, discharged with a certain charming personal care. He was Master of the Congress from 1929 to 1931, and in 1933 delivered the Doyne Memorial Lecture in which he summarised his valuable investigations on the aftermath of cases of intra-ocular foreign body. This was a practical piece of work, and will be found in full in the Transactions of the Ophthalmological Society (vol. liii., 1933). The chances of restored ocular function in these cases, which so often have tragic issue, were well summarised, and the conclusions based upon a vast number of recorded accidents. It happens, most pathetically, that in the series of articles entitled "Prognosis" now running in our columns, one of the next to appear will be from Cridland, the subject being the outlook for patients suffering from perforating injuries of the eyeball, a subject which he may be said to have made his own. As was inevitable, Cridland became deeply interested in welfare work for the blind; he was the British representative on the Council of the National Association for the Prevention of Blindness, and the mitigation of distress among our blind population was always near his heart. He was this year senior vice-president of the Ophthalmological Society of the United Kingdom and would have succeeded to the chair in due course, and he was also vice-president of the Council of British Ophthalmologists and honorary member of the French Ophthalmological Society. By no means a profuse writer, what came from his pen was always a record of practical experience, and his papers will be found for the most part in the *British Journal of Ophthalmology*.

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Bernard Cridland will be equally regretted by all his fellow workers and scientific colleagues and by a large circle of patients and friends. He was a golfer, a motorist, and a fisherman, while his wide connexion with his professional specialty was due largely to his work at the Oxford Ophthalmological Congress, whose meetings displayed his fine personal qualities. "That Congress," writes one of his friends, "brought out all that was great and lovable in the man. It was a pet child of his and he spared neither time nor energy in promoting its welfare and success. He acted as secretary to the Congress for many years, and no more perfect secretary could have been found; genial, friendly to all, he never seemed to forget a name or a face. He was never harassed and never fussed. He was most ambitious for the high standard of the Congress, and it is mainly due to his devotion that it has reached its present position. It is tragic that his death should have occurred on the eve of its meeting."

WILLIAM ARTHUR VALENTINE, M.D. Dub.

The death is announced at Appledore, North Devon, of Dr. William Valentine, one of the best known practitioners in his district. He was born in County Fermanagh 65 years ago, and received his medical education at the University of Dublin. He graduated in arts and took the M.B., B.Ch. degrees in 1891, and three years later proceeded to the M.D. He settled in practice at Appledore in 1898, and in due course came to hold many public posts. He was district medical officer for the Northam district, M.O.H. to the Barnstaple port sanitary authority, surgeon agent to the Admiralty, medical inspector of seamen for the port of Bideford, and surgeon to the Bideford and District Hospital.

As quite a young man Dr. Valentine had been interested in the volunteer movement; he became M.O. to his territorial battalion, and on the outbreak of war proceeded with a division of the Devonshire Regiment to India. Later he served in France with the Royal Fusiliers, and in the closing phase of hostilities he was attached to the Serbian Army in Salonica. He came in for a warm tribute as a soldier-doctor in a book by Major Cecil Alport, recently reviewed in these columns, and entitled "The Lighter Side of the War." He is spoken of there, in ref to his work at Salonica, as "just the sort of d we required, especially as he had already seen se in France. He was well over age . . . he jo us and spent the last two years in the Near E doing very excellent work indeed . . . a good m and a stout fellow this." For his services in Saloni Valentine received the Serbian Order of St. Sav and was appointed a Knight of the Redeemer o Greece. He always cherished the greatest affectio for the 1/6th Battalion of the Devonshire Regiment, at whose annual reunion in Barnstaple he was a highly popular figure. He was a prominent member of the British Medical Association, acting as chairman of the North Devon Division and as a member of the representative body, while he was nominated last year as president-elect of the S.W. branch, but was unable through failing health to take up election, which occurred just before his death.

Dr. Valentine was keenly interested in lifeboat work at Appledore. He was also an experienced yachtsman, having been vice-commodore of the Taw and Torridge Sailing Club. His wife predeceased him, but he leaves two sons, one of whom succeeds to the medical practice in Appledore.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Royal Assent

In the House of Lords on Thursday, June 28th, the Royal Assent was given to a number of Acts, including the Unemployment Act, the Mines (Working Facilities) Act, and the London County Council (General Powers) Act.

Bills Advanced

In the House of Commons on June 28th the Road Traffic Bill passed through Committee and was considered on Report. On the following day (Friday, June 29th) the Bill was read the third time. On Thursday, June 28th, the South Devon and East Cornwall Hospital, Plymouth, Royal Hospital, Devonport and Central Hospital, Plymouth (Amalgamation, &c.), Bill was read the third time.

HOUSE OF COMMONS

THURSDAY, JUNE 21ST

Poor-law Relief in Scotland

Mr. Kirkwood asked the Secretary of State for Scotland the total number of persons in Scotland on able-bodied and poor relief as at May, 1934, compared with May, 1933; and what was responsible for the abnormal increase.—Sir Godfrey Collins replied: The number of persons, excluding dependents, in receipt of ordinary poor relief in Scotland at May 15th in the years 1933 and 1934 were 90,959 and 98,193, respectively, an increase of 7·9 per cent. The corresponding figures for persons in receipt of able-bodied relief were 43,348 and 72,338 respectively, an increase of 66·8 per cent. With regard to the latter part of the question, the hon. Member will see that there have been increases in both cases. As regards the ordinary poor, the cause of the increase would appear mainly to be the cumulative effect of the long continued industrial depression in exhausting resources available for the support in working-class families of non-able-bodied members of the family. With regard to the much greater increase of the able-bodied who are receiving relief, I am informed that 91 per cent. of this increase has occurred in Glasgow and Greenock where the rates of relief were recently increased, involving the addition to the poor roll of persons whose unemployment insurance benefit and transitional payments are being supplemented.

WEDNESDAY, JUNE 27TH

Diphtheria Immunisation

Mr. Groves asked the Minister of Health (1) what was the child population of Dagenham at the following ages: up to 5, 6 to 10, 11 to 15; how many Dagenham children at each of these age-periods had received three injections of the diphtheria immunising mixture in each of the years 1931, 1932, and 1933; how many of these were subsequently Schick tested; and how many of those Schick tested were found negative as a result of the test; and (2) how many cases of diphtheria were notified in Dagenham in the year 1931.—Sir Hilton Young replied: The child population of the Dagenham urban district at the ages referred to by the hon. Member was, at the census of 1931, (1) up to 5—15,954; (2) 6 to 10—15,503; (3) 11 to 15—8559. As regards the remainder of the question, the following is the information furnished by the local authority. The figures for immunisation and testing for any year may not strictly correspond as children immunised in any year are not necessarily Schick tested in the same year.

Age-period.	Children who received three injections of immunising. mixture.			Children Schick tested after immunisation.			Children found negative on Schick testing.		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
Under 6 years..	499	234	193	—	253	88	—	194	85
6 to 10 ..	480	300	163	—	402	160	—	305	145
11 to 15 ..	190	102	70	—	171	50	—	132	34

The number of cases of diphtheria notified in the urban district in the year 1931 was 207.

Mr. Groves asked the Minister of Health whether he was aware that, in a speech to sanitary inspectors, the deputy medical officer of health for Leeds admitted that 8 per cent. of the children inoculated by him with toxoid, with a view to preventing diphtheria, had suffered very severe reactions; and whether he would reques. officers of health who were responsible for the intro of this system to report to him all such serious i of the inoculations, together with information regar the material used.—Sir HILTON YOUNG replied: I a advised that the remarks to which the hon. Member refer related only to the use of powerful forms of diphtheria prophylactic employed to induce rapid immunisation. The speaker, therefore, stressed the importance of applying a preliminary test which would discover the possibly severe reactors, and of immunising these by the ordinary routine method. In the circumstances, the action suggested in the last part of the question does not appear to be called for.

Inoculation and Parents' Consent

Mr. GROVES asked the Minister of Health whether he would advise all medical officers of health to ensure, when arranging schemes for any form of inoculation of school-children or children attending clinics, that no child be inoculated without the written consent of its parent or guardian.—Sir HILTON YOUNG replied: Advice of this kind has always been given in the official memoranda issued by my Department on this subject, and I have no reason to suppose that it is not generally followed.

THURSDAY, JUNE 28TH

Miners' Nystagmus

Mr. TINKER asked the Home Secretary if his attention had been draw to cases where mine workers who had been suffering from nystagmus had been declared recovered by the medical referee and fit to resume their former occupation, but had been refused employment on the grounds that they were liable to contract nystagmus again; and if he would consider amending the Workmen's Compensation Act so as to entitle them to compensation when they could prove they were deprived of employment because of having suffered from this disease.—Sir JOHN GILMOUR replied: Nystagmus is not the only injury or disease in view of which employers may be unwilling to take the risk of re-engaging the workmen for his old work when he has become physically fit for it; and the question whether in such circumstances it is desirable, and indeed in his own interests, that the workman should be entitled to further compensation is by no means a simple one. Various other proposals have been made for modifying the conditions under which compensation is payable for this disease, and a full inquiry would be necessary before the question of amending legislation could be considered.

Mr. TINKER: Is the Minister aware that the House of Lords on June 11th decided a case of this character, and that it is imperative that something should be done because the men have no right to claim compensation and cannot get work when they are suffering from this disease? Surely the time has come when we should protect men in cases like these?

Sir J. GILMOUR: If I were satisfied that there was a general demand in the mining industry for an inquiry into this subject I would be prepared to set up a committee.

MONDAY, JULY 2ND

Medical Practitioners in Palestine

Mr. WEDGWOOD asked the Secretary of State for the Colonies (1) whether and, if so, why new immigrant doctors into Palestine were restricted to five a year; and whether there was a limitation on the numbers of doctors or lawyers allowed to practise in any other British Colony or Dominion; and (2) whether there were any and, if so, what restrictions on the number of Jewish refugees from Germany practising as doctors in Palestine; and, if so, who asked for the restriction.—Sir P. CUNLIFFE-LISTER replied: In March last the Executive of the Jewish Agency in Palestine was informed of the proposal of the Palestine Government to institute measures for the limitation of the number of licences to be issued annually to doctors, dentists, and advocates. I am not aware that any request for such restrictions had been ade. No legislation has yet been enacted to give effect these proposals, which are at present the subject of espondence between the High Commissioner and lf. So far as I am aware, no similar system of ion exists in other British Dependencies or in the erning Dominions.

Quinine Stocks in India

ess of ATHOLL asked the Secretary of State for e would explain why 300,000 lb. of quinine owne Government of India were lying idle; for how lo d been the case; and what arrangements were no ntemplation for making this stock of quinine a for the millions who annually suffered from mala could not procure it.—Sir S. HOARE replied: The ment of India habitually maintain a reserve stock ine for emergencies. This reserve rose to 300,000 t 1926 and continued at or above that figure until 1 Measures have since been initiated to reduce it to 150, which is regarded as a sufficient reserve. In March, 1 had been reduced to 28[illegible],759 lb. I have no later figure, I understand that the Government of India are doin ir best to increase [illegible]les. I will ask them for a furt eport with reference to the last part of the question.

Disposal of Lo n Refuse

Sir FRANCIS FREMANTLE askea he Minister of Health whether the Advisory Committee n London Refuse had yet reached any conclusions for the improvement of the disposal of refuse; and what action the Ministry of Health proposed taking in the matter.—Sir HILTON YOUNG replied: I understand that the draft of an interim report is now being considered by the committee. I hope that the committee can complete this report at an early date.

Bonus and Salary in Civil Service

Mr. JOHN WILMOT asked the Chancellor of the Exchequer if he could make any statement as to the intention of the Government with regard to the consolidation of bonus and salary in the Civil Service.—Mr. DUFF COOPER (Financial Secretary to the Treasury) replied: It is a matter of regret that the negotiations on this subject on the Civil Service National Whitley Council have resulted in the inability of the staff side to enter into an agreement with the official side on the basis of the proposals made by them with the approval of the Government. The Government have accordingly reviewed the whole position in the light of all the circumstances. They are satisfied that the proposals made are fair and reasonable and that it would be right to put them into operation from July 1st. An announcement to this effect was accordingly made at the meeting of the National Whitley Council on Friday, June 29th, and detailed instructions will be issued at an early date.

The following is a summary of the proposals in broad outline:—

Consolidation will be effected as from July 1st, 1934, on the terms set out in paragraphs 352, 355, and 356 of the report of the Royal Commission on the Civil Service, or with reference to a cost of living figure of 55, whichever is more favourable, with the proviso that the remuneration so arrived at shall remain subject to abatement at the appropriate rates so long as half the emergency reductions continue in force. In other words, the pay of a civil servant, hitherto remunerated by means of basic pay plus cost of living adjustment under the stabilisation agreement, will be measured (for so long as half the emergency reductions remain in force) as half-way between his pay under that agreement and the consolidated pay which would result from the full application of the consolidated scheme. In all cases of established civil servants retiring on or after July 1st, 1934, the full consolidated rate will be deemed to be the annual salary and emoluments of the office within the meaning of Section 2 of the Superannuation Act, 1859, by reference to which pensions, additional allowances, and gratuities will be calculated. In accordance with the terms of Section 4 of the Superannuation Act, 1887, awards of gratuities

ADDRESSES AND ORIGINAL ARTICLES

VIRUSES IN RELATION TO THE ÆTIOLOGY OF TUMOURS *

By C. H. Andrewes, M.D., M.R.C.P. Lond.
MEMBER OF SCIENTIFIC STAFF, NATIONAL INSTITUTE OF MEDICAL RESEARCH

This subject, the ætiology of tumours, is rather far removed from those dealt with by previous Oliver-Sharpey lecturers. It is also one which has tended to engender unnecessarily bitter arguments amongst those who discuss it. Nevertheless it seems to me that the parasitic theory of cancer needs to be carefully reconsidered in the light of our growing knowledge about viruses; and some recent work I shall have to refer to makes the subject particularly ripe for discussion at the present time.

I do not propose to attempt the difficult feat of providing proof that mammalian tumours are caused by viruses: that is something which cannot be done to-day. I shall content myself with a more limited but quite definite objective, that of persuading you that the parasitic hypothesis of cancer is not dead but very much alive. I shall try to show that many of the known facts about tumours are *consistent* with the view that the behaviour of tumour cells is essentially due to infection of those cells by a parasitic virus: further, that certain facts are difficult to reconcile with any other view. On the other hand, I shall have to discuss certain features of neoplasms which are very hard to explain on the virus hypothesis and to consider several attempts which have been made to reconcile apparently discordant facts.

Let us first inquire why viruses are worth considering at all in relation to tomours. Cancer has been considered as a parasite since the earliest times, and many would still so consider it, regarding the cancer cell itself as of parasitic nature. But with the discovery of bacteria and protozoa in the last century there began to appear a host of claims that specific micro-organismal parasites had been seen in or cultivated from tumours. None of these claims has stood the test of time and interest in the parasitic theory of cancer has accordingly waned. Recently, however, the theory has arisen once more, phœnix-like, in the form of what is called the virus hypothesis. It is widely believed that the viruses constitute a group of very small organisms adapted to a parasitic existence within cells of animals and plants, and this conception has naturally excited interest once more in the possibility of a relationship between the viruses and benign and malignant neoplasms.

Filtrable Tumours of Fowls

In considering this subject we naturally think first of all of the filtrable fowl sarcomata. In 1910 began to appear the studies of Rous and Murphy and their associates on fowl sarcomata, tumours which are transmissible by means of cell-free filtrates. But the seed fell upon stony ground and no general interest was taken in their observations. The edition of Ewing's well-known "Neoplastic Diseases" published in 1919 contains a 13-page chapter on "the parasitic theory of cancer" in which the word "virus" does not occur. Rous's sarcoma is dismissed elsewhere in the book as a disease sui generis.

But during the last decade interest in the filtrable fowl tumours has steadily increased. The salient facts about these tumours are as follows. In general they resemble mammalian sarcomata, infiltrating locally and metastasising to distant parts of the body; reasons for believing them to be true tumours will be discussed presently. They are of several different histological types including spindle-celled sarcoma, osteochondrosarcoma, endothelioma and so on, covering all the range of mammalian connective tissue tumours. No filtrable epithelial fowl tumour has, however, been described as yet. The best-known fowl tumour is the Rous No. 1 spindle-celled sarcoma.[1] In view of the many different tumours which have now been described it is incorrect to speak of all filtrable fowl tumours as Rous sarcomas or Rous tumours; such a terminology suggests that all are alike. These growths differ essentially from mammalian tumours in one property: they can be transmitted by filtrates or desiccated material containing no formed cell-elements. The active agent in these filtrates or desiccates is generally regarded as a virus; its claims to be considered as such will be discussed later. The fowl tumours differ also from mammalian growths in that some of them will grow progressively when inoculated into adults of a foreign host, such as pheasants or ducks. Mammalian neoplasms cannot be propagated in a foreign species unless very young animals are used.

The importance of these tumours rests largely on the fact that their existence renders untenable most of the arguments which had been built up to show that the parasitic theory of cancer *could* not be true. These arguments ran along lines such as these: the age-incidence of cancer is unlike that of parasitic diseases; the anatomical and physiological characters of cancer tissue differ from those of infectious processes; abnormally large size of cell and nucleus, so common in cancer, is not the rule in inflammation; a cancer continues to grow at the expense of the body in a way which has no parallel in any other condition; the fate of metastases of cancer is entirely different from that of infective emboli; tumour tissues are transplantable to a new host in a manner unlike that of any other tissues, and so on. Rous's work showed that fowl tumours which were produced by the action of a virus-like agent resembled classical tumours in all of the points discussed. In other words, all these theoretical objections to a parasitic theory of cancer fell to the ground.

One not infrequently hears this argument: it is agreed that a virus may cause certain tumours, but this finding is considered to be on the same footing as the causation of tumours in rats affected by worm-infestation or the production of epitheliomata in mice by tar and other chemical agents. "Viruses, worms, tar—all these agents can produce cancer. Why not maintain that all tumours are caused by worms; it is as reasonable as postulating a virus for every new growth!" Those who reason thus miss the essential differences between the rôle played by the virus and the rôle of, let us say, the tar. The tar only produces tumours after a long latent period; the virus of the Rous sarcoma acts almost immediately, and malignant changes can be seen only a few days after inoculation. Again, tar acts only by initiating a cancerous change; it is not multiplied in the growth nor recoverable from metastases or transplanted tumours; the fowl tumour viruses multiply as the tumour multiplies and can be obtained from it after many transplantations. The tumours gives no clue to suggest that in them either is there an extracellular agent. The rare cases of carcinoma sarcomatodes, instances of apparent malignant transformation of the stroma of an epithelial tumour may be significant.

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* The first Oliver-Sharpey lecture for 1934, delivered before the Royal College of Physicians of London on May 1st. The second lecture will appear next week.

MOUSE SARCOMA 37S

In one of the Imperial Cancer Research Fund's mouse carcinomata (37) such a transformation of stroma apparently occurred, and from this has been obtained a sarcoma known as 37S. Workers with this tantalising tumour seem always on the point of showing that it can be transmitted by a cell-free agent, but the evidence is never quite convincing enough. First, Gye[31] found that one strain of this tumour (polymorph 37) would grow in very young rats in a free manner not usual with heteroplastic grafts. He did not provide proof, however, that the tumours consisted of rat cells and not of mouse cells. Secondly, it was reported, again by Gye,[32] in 1925 that Berkefeld filtrates of diffusates of 37S would produce sarcomas in mice. These experiments appeared conclusive; unfortunately neither Gye nor other workers have been able to repeat them. It is conceivable that, just as Rous No. 1, usually filtrable, passes through phases of poor growth and non-filtrability, so 37S, usually non-filtrable, occasionally reaches maximal virulence and is then filtrable. Unless and until the tumour can be filtered again we cannot decide. Thirdly, Cramer[8] found in 1930 that 37S, unlike mouse carcinomata, would still produce tumours after being frozen and thawed eight times; he could obtain no evidence that living cells were present after this treatment. Gye and Purdy,[33] however, investigating histologically the fate of grafts of such material, thought it probable that some cells were living after four freezings and thawings. Fourthly and lastly, Tinozzi[34] produced tumours by inoculating into other mice minced embryos taken from pregnant mice bearing 37S sarcomata; he believed that transplanted cells could not be held responsible for the growths, particularly as the placentæ gave negative results.

The Natural History of Viruses

We must turn aside for a short time to consider some general properties of viruses in an endeavour to see whether viruses can reasonably be expected to be capable of giving rise to tumours. Such digression may seem unnecessary since I have already argued that some viruses, those of the fowl sarcomata, not only might reasonably be expected to cause but actually do cause true new growths. The matter is, nevertheless, important to discuss in view of the doubts to be dealt with later as to whether the fowl tumour agents are really viruses. Most virus diseases are short, acute, self-limited infections; measles, mumps, chicken-pox, and small-pox at once occur to the mind. Is it or is it not reasonable to seek for the cause of cancer amongst agents producing infections of such a type?

INTRACELLULAR HABITAT OF VIRUSES

It seems fairly certain that many viruses multiply within the cells of the host. The cytoplasmic inclusions of many viruses of the pox group consist of aggregations of particles which probably represent the virus bodies themselves. The studies of Borrel,[35] Goodpasture,[36] and of Barnard[37] on the viruses of fowl-pox, canary-pox, and ectromelia (a virus disease of mice) may be quoted. The antibodies in resistant animals which neutralise viruses possibly act by altering their physical state so that they cannot penetrate or infect susceptible cells. In any case, it appears that once a virus is inside a cell, antibody in the fluids outside the cell is unable to neutralise it nor to prevent it from multiplying. This has been shown by studies of viruses (herpes simplex, virus III., yellow fever) growing in tissue cultures. Certain viruses will produce characteristic inclusion bodies in cells infected in vitro in tissue cultures. If the tissues are suspended in immune serum no infection of the cells can take place; but if virus is given opportunity to infect the cells before antiserum is added, then the typical inclusion bodies are able to develop (Andrewes,[38 39] Haagen[40]). Rous, McMaster, and Hudack[41] have lately shown the same thing more directly. Suspensions of rabbit fibroblasts were obtained by digesting tissue cultures with trypsin. The viruses of vaccinia and of Shope's rabbit fibroma (to be mentioned shortly) were adsorbed to these cells. The virus-treated cells were then suspended in antisera for the respective viruses and later washed. It was found that the sera had been unable to neutralise the viruses adsorbed to the cells, while virus unprotected by cells was quickly inactivated. Similarly Perdrau and Todd[42] found that many viruses were inactivated by methylene-blue in the presence of light. Virus in cell suspensions from infected tissues was, however, protected by its intracellular position from this photodynamic destruction.

These facts have a definite bearing on the virus theory of tumours. We have to explain why a hypothetical cancer virus is not destroyed by neutralising antibodies as the viruses of measles and chicken-pox presumably are during convalescence. If our cancer virus were to exist in a state of equilibrium with the parasitised cell, stimulating it to divide but not destroying it, it would clearly never have to come into the open where antibodies could get at it. Secure in its stronghold it could defy the dangers without.

A possible reason for the persistence of virus III. in the Brown-Pearce rabbit tumour is now apparent. If cells in such a tumour are multiplying rapidly enough, extraneous viruses in the cell may find themselves carried to daughter and then to grand-daughter cells, yet not necessarily reaching a high enough concentration to produce cell death. They need thus never be brought into contact with the immune serum which could eliminate them from the scene of action.

At this point I must digress for a few moments in order to avoid possible misconceptions. We have had to consider immunity to viruses in our endeavour to understand how viruses could cause new growths. But immunity to tumours is probably a complex phenomenon, by no means to be wholly explained in terms of immunity to a virus. Much work has been done on immunity to transplanted tumours in mammals, which is really a question of immunity against the cells of a foreign individual and does not greatly concern us to-day. Then there has to be considered the mechanism by which regression of established new growths occurs. Relative immunity to a tumour virus itself may also be involved, perhaps in determining whether a spontaneous tumour does or does not arise at all.

Many clinical and experimental data are available bearing on immunity to tumours; for instance, there is the vexed question of whether multiple primary new growths occur with more or less than the expected frequency. But these and other facts are of such doubtful interpretation that they seem at present hardly relevant to a discussion of the virus hypothesis.

Pathological Changes Produced by Viruses

The lesions which viruses produce consist firstly, of changes in the cells which are primarily attacked, and, secondly, of the inflammatory reactions which follow.

We are at present concerned only with the primary response of the parasitised cells. In these, viruses cause either proliferation or necrosis or, very often, proliferation accompanying or followed by necrosis. One also sees in many instances the formation of cytoplasmic or intranuclear inclusion bodies, and these inclusions may be found, as in vaccinia and fowl-pox, in cells actually engaged in mitosis. Often the proliferation is early and comparatively slight: necrosis sets in quickly. With other viruses the proliferative changes dominate the picture. Proliferation and necrosis are, of course, seen in many inflammatory conditions caused by bacteria or by non-living agents; their interest in virus diseases depends upon the evidence that in these instances they are caused by a parasite within the cell.

One can point to examples of every type of change produced in cells by the action of a virus, from pure necrosis to almost pure proliferation. If one agrees provisionally to consider tumours as a group of virus diseases one can construct in this way an ordered series of virus lesions extending from small-pox to cancer. The cell involved may be epithelial or of connective tissue origin. It happens that at the "tumour end" of our scale we find a more beautifully graded series amongst the disorders of the connective tissues; at the other end the infections of the epithelial cells are better represented (see Table). Nevertheless, it will be better to consider the two series separately to start with.

Necrosis to Neoplasia

Epithelial series.	*Connective tissue series.*
Foot-and-mouth disease.	Canary-pox.
Vaccinia.	Vaccinia.
Fowl-pox.	Infectious myxoma (rabbit).
Sheep-pox.	
Molluscum contagiosum.	Infectious fibroma (cottontail).
Filtrable warts (man, dogs, cattle).	Fujinami sarcoma (duck).
Filtrable warts (rabbits).	Fujinami sarcoma (fowl).
Non-filtrable papillomata.	Rous sarcoma No. 1.
Rodent ulcer.	Mill Hill 1 fibrosarcoma.
Malignant epithelioma.	Non-filtrable fowl sarcoma.
	Mammalian sarcoma.

FROM NECROSIS TO NEOPLASIA: THE EPITHELIAL SERIES

Foot-and-mouth disease affords an example of a virus which produces in the cells attacked necrosis almost without preliminary proliferation. Small foci of epithelial cells become degenerated, and the spreading of this necrosis gives rise to the formation of a vesicle.

The lesions produced by vaccinia show varying combinations of cell destruction and multiplication. In the rabbit's testis the virus produces necrosis of epithelium without proliferative lesions. In the skin of the calf the degenerative process is almost unaccompanied by proliferation. But on the cornea of the calf or rabbit lesions of both types are seen. Within a few hours after inoculation one can find enlargement of individual epithelial cells and also mitotic and amitotic multiplication. The intracellular Guarnieri bodies also appear in many cells within a few hours. After a few days degenerative changes are more evident and many of the cells containing Guarnieri bodies have been engulfed by normal epithelial cells. Proliferative processes in this instance seem to precede degeneration, but the exact relations of the two are hard to disentangle.

In fowl-pox also we find multiplication of affected cells preceding destruction. So great is the growth of tissue here that nodules of considerable size are formed; hence the name epithelioma contagiosum. After the initial proliferative changes, inclusion bodies, larger than those of vaccinia, appear in the cells, which themselves become much enlarged. Mitosis, however, may still occur in cells containing these bodies. Finally the cells are killed and degenerative changes predominate. The lesions of human molluscum contagiosum bear a close resemblance to those of fowl-pox. The visceral lesions of sheep-pox are at first sight extraordinarily suggestive of a neoplastic process (Bosc,[43] Borrel[44]); they take the form of adenomatous nodules in the stomach, lungs, and even in the mammary gland of the affected sheep. Inclusion bodies occur in the cytoplasm of the proliferating epithelial cells and numerous mitoses may be found, many of them atypical. The alveoli in the pulmonary lesions are full of swollen cells apparently formed from multiplication of altered cells lining their walls.

Infectious warts of man have their parallel in similar conditions in dogs and cattle. Here we find that the lesions, which again are caused by a filtrable agent, are for some time entirely proliferative. There is no general agreement as to whether inclusion bodies are present in human warts. After growing for some time, warts, both in man and in dogs, are apt to regress rather suddenly, and the host is then commonly immune to reinoculation. Shope[45] has described "infectious papillomatosis" as occurring in wild cottontail rabbits in America. While the warts of man and dogs have not been proved to be transferable to species other than their natural hosts, Shope succeeded in infecting domestic rabbits with his cottontail warts. (The domestic rabbit is of a different genus from the cottontail.) Cottontail warts are perhaps one stage nearer a true tumour than are other warts, for they seem to go on growing indefinitely, showing so far as is yet known neither a tendency to regression nor to the development of malignancy†; they may become as large as a human fist. While Shope readily infected domestic rabbits with material from cottontails, he found great difficulty in transmitting these warts in tame rabbits, rapidly though they were growing, to other tame rabbits. He points out that in so far as they are—in the tame rabbit—not filtrable and not even propagable by grafting they are exactly comparable with many spontaneous epithelial tumours of mammals.

It will not be hard to continue the series of epithelial growths from the progressive cottontail papilloma, through various non-filtrable papillomata of man and animals, till we reach those of local malignancy, such as a rodent ulcer and finally a fully malignant human epithelioma. The suggestion that epithelial new growths do not necessarily constitute a class apart from other disorders of epithelial cells was made over thirty years ago by Borrel.[44] In an admirable paper entitled Infectious Epithelioses and Epitheliomas, published in 1903, he compared the proliferative lesions of vaccinia, sheep-pox, and molluscum contagiosum with those of mammary cancer in the mouse.

FROM NECROSIS TO NEOPLASIA: THE CONNECTIVE TISSUE SERIES

When we turn to the virus diseases attacking the connective tissues we naturally find it harder to distinguish between the primary injury inflicted by a virus on the cells and the results of the secondary inflammation. Accumulation of wandering cells and multiplication of various types of cells, both mobile and fixed, makes us chary of maintaining that the specific stimulus of a virus has [illegible] of one type of connective tissue cell; and clearly it is only a definite stimulation of one type of cell which we can compare with a tumour; anything else would have to be classed as an infective granuloma.

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† Since this lecture was delivered a note by Rous and Beard has appeared in Science (1934, lxxix., 437); they report that warts grafted as autoplasts into the internal organs of rabbits show many of the features of malignancy.

As an example of a virus producing necrosis of connective tissues we may point to the canary virus described by Kikuth and Gollub[46] and shown by Burnet[47] to be related to fowl-pox. This virus attacks epithelial as well as connective tissues; on subcutaneous or intramuscular inoculation it produces acute local œdema and necrosis. The involved mononuclear cells show vacuolation and there is little doubt that the virus multiplies locally in them.[47]

The lesions of vaccinia also are not confined to epithelial structures. With at any rate some strains of the virus, proliferation of endothelial cells is a striking feature of the histological picture. This is seen in the small vessels in a skin lesion, and in the spleen and the so-called lung pocks of generalised vaccinia in the rabbit. Endothelial proliferation occurs, however, in so many pathological conditions that one hesitates to stress unduly these vaccinial lesions; there is no certainty that the virus is multiplying in the affected cells.

Infectious myxoma of the rabbit is a highly contagious fatal disease of rabbits first described from South America. But besides acute conjunctivitis and other signs of inflammation, the affected rabbits show tumour-like myxomatous masses in the subepidermal tissues and in the lymph-nodes. These myxomata contain large stellate or polygonal cells which appear, according to Rivers,[48] to have multiplied under the stimulus of the virus. In the lymph-nodes they possibly arise from the reticulum of the gland. Mitoses are present in the lesions though not numerously. At the end of his paper describing the pathological changes in this disease, Rivers writes as follows:—

> "If, as some believe, the Rous sarcoma appears to be more closely related to true neoplasms than to diseases induced by highly contagious agents, then the myxoma, upon further study, may serve to bridge the gap between the Rous tumor and other virus maladies, and to indicate that, after all, no great difference exists between tumor-forming viruses and those causing vesicular or destructive lesions."

Another disease which may further help to bridge the gap is the infectious fibroma lately described by Shope.[49] This, like the infectious wart, naturally occurs in wild cottontails and is transmissible also to laboratory rabbits. In the cottontail one finds subcutaneous fibroma-like lesions which only regress after many months. On injecting such material —or filtrates from it—into the testes or subcutaneous tissues of tame rabbits, Shope found that similar fibromatous lesions developed. They were white, rubbery in consistence, and histologically showed masses of spindle-shaped or polygonal cells, often in whorls; mitoses were scarce. Dr. Shope kindly sent me some of this virus and I have studied histologically the early changes produced by it in a rabbit testis and can confirm his findings; the primary lesion is a proliferation of the connective tissue cells, though some polymorphs are usually to be found also. Later the picture strongly recalls a spindle-celled sarcoma. There is, however, no metastasis to distant organs, and the fibromata always ultimately regress. The condition was unexpectedly found by Shope to be related to infectious myxomatosis, some cross-immunity between the two diseases being present; the fibroma-like condition differs greatly from the other, however, in that infection of one rabbit from another has not yet been demonstrated. I found no evidence of cross-immunity between the fibroma virus and a true tumour in a rabbit; rabbits in which the epithelial tumour of Brown and Pearce had regressed were normally susceptible to Shope's fibroma virus.

The interest of this virus does not end here. For apparently a mutation or adaptation of the virus can occur when it is passed through domestic rabbits. As a result of this change it no longer produces cell proliferation and tumour-like swellings but causes fever, necrosis at the site of inoculation, œdema, hyperæmia, and acute outpouring of inflammatory cells. More than this, inoculated rabbits may develop on the shaved skin generalised pock-like lesions recalling those of generalised vaccinia in the rabbit. I have recently had under study three strains of the virus: (*a*) is but a little way removed from the original cottontail tumour and produces fibroma-like lesions often of considerable size; (*b*) causes no primary proliferation of connective tissue cells but only acute inflammation accompanied by generalised pocks; (*c*) is a mixed strain which gives rise to nodules of fibroma-like growth in the midst of inflammatory lesions but never to big tumours; it also frequently produces skin-pocks. So far as I can determine I am not dealing with a mixture of two distinct viruses. The inflammation-producing strain completely immunises against the tumour-causing strain and vice versa. Neutralisation tests with immune sera confirm this result. We have apparently to deal with a virus which in two phases of activity can produce what is very like a tumour—or what is more like an eruptive fever. The interest of such a virus to the present argument needs no emphasis.

The next example in our series is Fujinami's[50] myxosarcoma as it affects well-grown ducks. Filtrates of this tumour, which was originally of fowl origin, injected into the leg of an adult duck produce tumours which grow very rapidly and may reach almost the size of a tennis-ball before they begin to regress[51] as, in the end, they always do. They only show local malignancy and do not metastasise. Histologically the picture is that of a myxosarcoma. Clearly the state of affairs is not very different from that of one phase of Shope's rabbit fibroma. The tumour is propagable by means of filtrates, but only if tumours from young ducklings are used as the source of material. In these young ducklings the picture differs chiefly in that the death of the bird often occurs; possibly this results from mechanical causes, the tumours being large relatively to the size of the host. If filtrates of this same sarcoma of Fujinami's are injected into a fowl the events are at first like those in the duck; a local sarcomatous tumour develops. But instead of regressing after a week or two it continues to grow and the bird almost invariably dies. Metastases occur, chiefly in the lungs, liver, and heart. The tumour is propagable indefinitely by means of cell-free filtrates; it is in fact in most respects identical with the Rous No. 1 sarcoma.

We may next turn to the Rous sarcoma when in the state, already mentioned, in which it grows poorly and cannot be filtered.[7] We may point out that during these phases its behaviour is like that of a non-filtrable mammalian sarcoma. The fowl endothelioma of Begg (Mill Hill 2)[52] is still more apt to defy all efforts at filtration for long periods.

A next stage is seen in the slow-growing fowl fibrosarcoma Mill Hill 1, also described by Begg. For about three years after it was first propagated it formed such hard growths that it was impossible to make an extract wherewith to test filtrability. After a few passages it began to grow more rapidly and was finally found to be filtrable.[6]

From such a tumour it is not a difficult step to a fowl-sarcoma which has not yet been filtered, nor from that to a non-filtrable mammalian sarcoma.

In the course of these lectures I have frequently used the term "true tumour," but I do so against my better judgment. I neither affirm nor deny that, for instance, Shope's rabbit fibroma is a true tumour, for the more I consider the two pathological series just described, the less I know what a true tumour is. One can, of course, draw an arbitrary line anywhere in the series I have described if one chooses to define a tumour according to one criterion only, for instance, non-transmissibility by filtrates, power of infiltrating growth, power of progressive independent growth, ability to metastasise, or formation of tumour by multiplication of a single cell type. But if one believes, as most pathologists do, that a tumour is best defined by considering a number of criteria, then one cannot, so far as I can see, draw a sharp line across either of these two series; nowhere can one reasonably say "Below this line are tumours, above it are infections."

Metabolism of Virus Lesions

The work of Warburg and his collaborators on the carbohydrate metabolism of tumours has shown that these differ from normal tissues in the relatively large part played by anaerobic glycolysis as compared with aerobic oxidation or respiration. The facts brought to light have been used as the basis of theories of carcinogenesis. Crabtree[53] has applied Warburg's technique to the study of pathological overgrowths caused by viruses. Tissues from fowl-pox and from human warts showed essentially the same carbohydrate metabolism as Warburg found in tumours; so did material from Rous sarcoma. On the other hand, lesions from the skin of rabbits with vaccinia and from the brain of a guinea-pig with rabies showed no great deviation from normal. The abnormal metabolism appears to be associated with cell proliferation as such and not to be specifically associated with "true" tumours.

In this first lecture I have attempted to maintain that the behaviour of a tumour, *once the malignant change has begun*, is what might be expected of a virus disease in which there was a certain balance between the infecting parasite and the host-cell, so that neither tended to destroy the other. If this were all, the parasitic theory of cancer would be much more popular than it is. But difficulties at once arise when we turn our attention to the inception of the malignant change in a cell; and these difficulties we have to face in the second lecture.

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PERINEO-ABDOMINAL EXCISION OF THE RECTUM IN ONE STAGE*

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CANCER of the rectum is one of the most hopeful of malignant tumours if treated by radical surgery, and one of the fascinations of the surgery of this region is the variety of operations which can be applied. This also constitutes a difficulty, for the operator has the responsibility of selecting the operation which he believes will be most suited to the particular case. In the light of our present knowledge it can be asserted that the operation of choice should be the most radical one that can be performed with reasonable safety to the patient; the patient's general condition, the extent of the growth, and its height above the anus, being the points which particularly need to be considered.

For many years there has been a controversy in this country regarding the merits of perineal excision of the rectum compared with the abdomino-perineal, and I think the present time is suitable for presenting certain facts which relate to this problem. There is a field of usefulness for each operation provided it is recognised that usually a combined abdomino-perineal or a perineo-abdominal excision (which latter, I venture to suggest, is the better method) is definitely more radical than a perineal excision. There are two possible exceptions to this rule.

(1) Those early cases in which there is a single small mobile carcinoma in the middle or lower thirds of the

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* A post-graduate lecture delivered at St. Mark's Hospital on June 15th, 1934.

virus on the cells and the results of the secondary inflammation. Accumulation of wandering cells and multiplication of various types of cells, both mobile and fixed, makes us chary of maintaining that the specific stimulus of a virus has led to proliferation of one type of connective tissue cell; and clearly it is only a definite stimulation of one type of cell which we can compare with a tumour; anything else would have to be classed as an infective granuloma.

As an example of a virus producing necrosis of connective tissues we may point to the canary virus described by Kikuth and Gollub[46] and shown by Burnet[47] to be related to fowl-pox. This virus attacks epithelial as well as connective tissues; on subcutaneous or intramuscular inoculation it produces acute local œdema and necrosis. The involved mononuclear cells show vacuolation and there is little doubt that the virus multiplies locally in them.[47]

The lesions of vaccinia also are not confined to epithelial structures. With at any rate some strains of the virus, proliferation of endothelial cells is a striking feature of the histological picture. This is seen in the small vessels in a skin lesion, and in the spleen and the so-called lung pocks of generalised vaccinia in the rabbit. Endothelial proliferation occurs, however, in so many pathological conditions that one hesitates to stress unduly these vaccinial lesions; there is no certainty that the virus is multiplying in the affected cells.

Infectious myxoma of the rabbit is a highly contagious fatal disease of rabbits first described from South America. But besides acute conjunctivitis and other signs of inflammation, the affected rabbits show tumour-like myxomatous masses in the subepidermal tissues and in the lymph-nodes. These myxomata contain large stellate or polygonal cells which appear, according to Rivers,[48] to have multiplied under the stimulus of the virus. In the lymph-nodes they possibly arise from the reticulum of the gland. Mitoses are present in the lesions though not numerously. At the end of his paper describing the pathological changes in this disease, Rivers writes as follows :—

> "If, as some believe, the Rous sarcoma appears to be more closely related to true neoplasms than to diseases induced by highly contagious agents, then the myxoma, upon further study, may serve to bridge the gap between the Rous tumor and other virus maladies, and to indicate that, after all, no great difference exists between tumor-forming viruses and those causing vesicular or destructive lesions."

Another disease which may further help to bridge the gap is the infectious fibroma lately described by Shope.[49] This, like the infectious wart, naturally occurs in wild cottontails and is transmissible also to laboratory rabbits. In the cottontail one finds subcutaneous fibroma-like lesions which only regress after many months. On injecting such material —or filtrates from it—into the testes or subcutaneous tissues of tame rabbits, Shope found that similar fibromatous lesions developed. They were white, rubbery in consistence, and histologically showed masses of spindle-shaped or polygonal cells, often in whorls; mitoses were scarce. Dr. Shope kindly sent me some of this virus and I have studied histologically the early changes produced by it in a rabbit testis and can confirm his findings; the primary lesion is a proliferation of the connective tissue cells, though some polymorphs are usually to be found also. Later the picture strongly recalls a spindle-celled sarcoma. There is, however, no metastasis to distant organs, and the fibromata always ultimately regress. The condition was unexpectedly found by Shope to be related to infectious myxomatosis, some cross-immunity between the two diseases being present; the fibroma-like condition differs greatly from the other, however, in that infection of one rabbit from another has not yet been demonstrated. I found no evidence of cross-immunity between the fibroma virus and a true tumour in a rabbit; rabbits in which the epithelial tumour of Brown and Pearce had regressed were normally susceptible to Shope's fibroma virus.

The interest of this virus does not end here. For apparently a mutation or adaptation of the virus can occur when it is passed through domestic rabbits. As a result of this change it no longer produces cell proliferation and tumour-like swellings but causes fever, necrosis at the site of inoculation, œdema, hyperæmia, and acute outpouring of inflammatory cells. More than this, inoculated rabbits may develop on the shaved skin generalised pock-like lesions recalling those of generalised vaccinia in the rabbit. I have recently had under study three strains of the virus: (*a*) is but a little way removed from the original cottontail tumour and produces fibroma-like lesions often of considerable size; (*b*) causes no primary proliferation of connective tissue cells but only acute inflammation accompanied by generalised pocks; (*c*) is a mixed strain which gives rise to nodules of fibroma-like growth in the midst of inflammatory lesions but never to big tumours; it also frequently produces skin-pocks. So far as I can determine I am not dealing with a mixture of two distinct viruses. The inflammation-producing strain completely immunises against the tumour-causing strain and vice versa. Neutralisation tests with immune sera confirm this result. We have apparently to deal with a virus which in two phases of activity can produce what is very like a tumour—or what is more like an eruptive fever. The interest of such a virus to the present argument needs no emphasis.

The next example in our series is Fujinami's[50] myxosarcoma as it affects well-grown ducks. Filtrates of this tumour, which was originally of fowl origin, injected into the leg of an adult duck produce tumours which grow very rapidly and may reach almost the size of a tennis-ball before they begin to regress[51] as, in the end, they always do. They only show local malignancy and do not metastasise. Histologically the picture is that of a myxosarcoma. Clearly the state of affairs is not very different from that of one phase of Shope's rabbit fibroma. The tumour is propagable by means of filtrates, but only if tumours from young ducklings are used as the source of material. In these young ducklings the picture differs chiefly in that the death of the bird often occurs; possibly this results from mechanical causes, the tumours being large relatively to the size of the host. If filtrates of this same sarcoma of Fujinami's are injected into a fowl the events are at first like those in the duck; a local sarcomatous tumour develops. But instead of regressing after a week or two it continues to grow and the bird almost invariably dies. Metastases occur, chiefly in the lungs, liver, and heart. The tumour is propagable indefinitely by means of cell-free filtrates; it is in fact in most respects identical with the Rous No. 1 sarcoma.

We may next turn to the Rous sarcoma when in the state, already mentioned, in which it grows poorly and cannot be filtered.[7] We may point out that during these phases its behaviour is like that of a non-filtrable mammalian sarcoma. The fowl endothelioma of Begg (Mill Hill 2)[52] is still more apt to defy all efforts at filtration for long periods.

A next stage is seen in the slow-growing fowl fibrosarcoma Mill Hill 1, also described by Begg. For

FIG. 1a FIG. 1b FIG. 1c

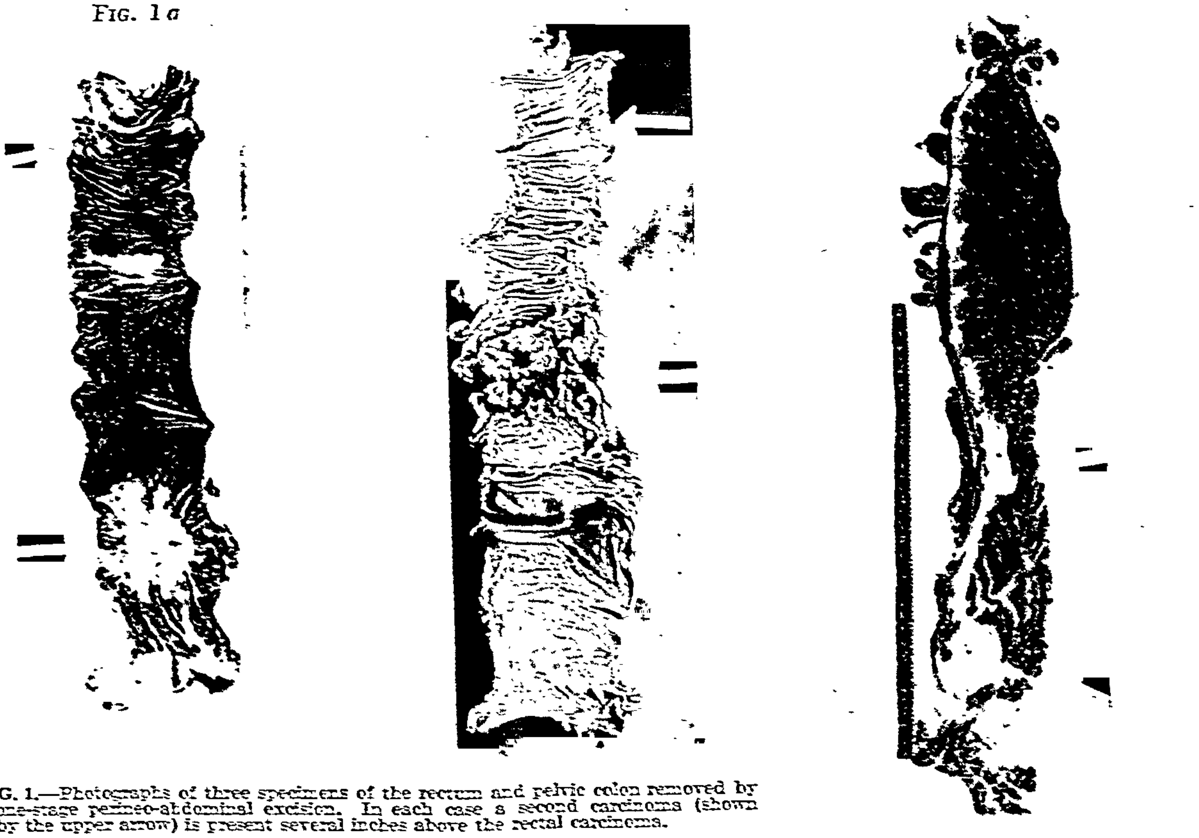

FIG. 1.—Photographs of three specimens of the rectum and pelvic colon removed by one-stage perineo-abdominal excision. In each case a second carcinoma (shown by the upper arrow) is present several inches above the rectal carcinoma.

(a) Specimen 18 inches in length from a male aged 62. An ulcerating growth, 2½ inches in diameter, extended almost completely round the middle third of the rectum; 9 inches above this growth there was a small indurated, pedunculated, and partly ulcerated tumour. Both tumours proved to be adenocarcinoma on section. Metastases present in the glands—C case.

(b) Specimen 18 inches in length from a male aged 77. A semi-ulcerated protuberant tumour almost completely encircled the upper part of the rectum; on section it was found to be an adenocarcinoma which had not extended into the extrarectal tissues. A pedunculated polyp 5 inches higher proved on section to be an adenoma which had undergone malignant change, with infiltration of the stroma. Glands free from metastases—A case.

(c) Specimen 21 inches in length from a male aged 66. Two ulcerating growths were present; one appeared as a flat ulcer 2 inches in diameter in the lower third of the rectum; the other, 1½ inches in diameter, completely surrounded the bowel in the rectosigmoid region. Both proved to be adenocarcinoma with involvement of the glands—C case.

to the colostomy. The presence of clear mucus on the perineal dressings is certain evidence of the development of a mucous fistula, which may in course of time close spontaneously; but it often persists, and is the cause of much continued annoyance from the discharge and recurrent perineal abscesses. A slight soiling of the wound no doubt takes place sometimes in the course of a perineal excision at the stage when the divided bowel is being inturned by suture. Occasionally serious sepsis occurs, and is, I believe, not uncommonly due to the presence of diverticulosis of the pelvic colon; diverticula contain highly infective material, and if they are pricked by a needle the consequences may be serious. I have lost one case of perineal excision from acute anaerobic wound infection with gas formation, which was undoubtedly due to this cause, and I now regard perineal excision as an operation of questionable merit in the short, thick-set subject, who has certainly a fat-laden pelvic colon, and possibly diverticulosis. Even if no gross sepsis occurs, the healing of perineal excision wounds often lags behind that of combined excision cases, and this is no doubt due to the presence of the sewn-over bowel stump, with a mild infection of the pelvic cellular tissues round it.

These various points form a very considerable argument in favour of a combined abdomino-perineal excision, provided a technique can be employed which will enable the operation to be done without a rigid exclusion, on the grounds of age or general condition, of that common type of rectal cancer case, particularly in males, who is classed as a "poor risk."

THE OPERATION RECOMMENDED

The merits of abdomino-perineal excision of the rectum by Miles's technique have been generally accepted, but the considerable number of two-stage modifications which have been described indicate the desire and the attempts of different surgeons to minimise the risks of the original operation. The chief risks of abdomino-perineal excision are sepsis and shock.

Sepsis may occur at the time of the intra-abdominal division of the pelvic colon, or during the time that the devascularised bowel is lying in the pelvis (pending the perineal removal), with a wide area of newly exposed pelvic cellular tissue round it.

Shock, most surgeons will agree, supervenes in the latter stages of the operation, particularly when the patient is turned over into the left or right lateral position, and during the final perineal excision.

The one-stage perineo-abdominal excision which will now be described is, I submit, an easier operation rectum without glandular metastasis or evidence of related adenomata above the growth. In such cases a perineal excision is as radical and as effective in curing the patient as an abdomino-perineal excision.

(2) Those late cases in which pre-operatively it is possible digitally to demonstrate extrarectal spread in the form of nodules or indurated lymphatics outside the rectal wall. These are advanced cases with marked lymphatic *spread, and if considered "operable" are certainly* ineradicable by the perineal route, and probably are equally ineradicable by a combined excision.

The early cancers low down in the rectum are rare, and it is problematical whether a surgeon, however experienced, can accurately forecast the presence and extent of extrarectal spread after a carcinoma has passed beyond the clinically early stage. In any average series of operable cases it is likely that approximately half will have glandular metastasis (Dukes[1] reports 47 per cent., McVay[2] reports 47 per cent.), and the following arguments favour a combined operation.

ADVANTAGES OF COMBINED OPERATIONS

1. *Situation of the primary growth.*—It is agreed by most authorities that the rectosigmoid is the common site for a carcinoma in this region. In a recent survey of 100 cases, Rankin, Bargen, and Buie[3] found that 69 were at the rectosigmoid juncture. This is in close agreement with the figure of 67 per cent. reported in 1903 by Tuttle,[4] and constitutes in itself a sound reason for carrying out a combined operation in at least two-thirds of the cases.

2. *Removal of the zone of upward lymphatic spread.*—Excision of the rectum by the combined route enables a ligature to be placed round the inferior mesenteric pedicle at an average height of 10 inches above the anus, which is at least 3 to 4 inches higher than the usual level of ligation effected in the course of perineal excision. In those cases in which extrarectal extension of the carcinoma has taken place with infection of the lymphatic glands (C cases by Dukes's classification), the extra few inches of the superior hæmorrhoidal pedicle gained by a combined excision may in some cases be the determining factor in eliminating the disease.

In a previous paper[5] I have reported that in C cases treated by perineal excision only 19 per cent. survived free from recurrence at the end of three years; this figure is almost identical with that reported by Rankin,[6] who shows 20·7 per cent. of good results after excision of the rectum in patients with proved metastases. It is now possible to state the results of the St. Mark's Hospital cases at five years; out of 20 C cases of perineal excision (operation survivals), operated upon prior to June, 1929, 15 have died from recurrence, 2 died from other causes, and only 3 have survived free from recurrence for five years—i.e., 16·6 per cent. ($\frac{3}{18} \times 100$). This result in a small series of cases expresses the failure by perineal excision to remove a sufficient length of the path of upward *lymphatic spread*, and in this respect there should be an expectation of achieving better results by a combined excision. At the present time, however, there is to the best of my belief no actual proof of the outstanding superiority of abdomino-perineal excision in C cases, and the following records suggest that in this late group a large proportion of cures cannot be expected. They summarise the results in 29 cases after survival from different types of combined abdomino-perineal excision.

(i) In 3 cases one-stage abdomino-perineal excisions were done more than five years ago. Of these 2 were A cases and have survived for nine and seven years respectively; 1 was a C case and died of recurrence two and a half years later.

(ii) In 4 cases two-stage abdomino-perineal excisions were done by Coffey's technique in 1929. Of these 2 were B cases and are now (June, 1934) alive and well; 2 were C cases and have died of recurrence.

(iii) In 1 case a two-stage abdomino-perineal excision using Dudley Smith's clamp was done in 1930. This was a C case and the patient died of recurrence 16 months later.

(iv) In 21 cases perineo-abdominal excisions were done between 1928 and 1933. There were 4 A cases and 6 B cases, who are all alive and well for varying times up to five and a half years. There were 11 C cases of whom 4 have died within three years after operation (2 recurred in liver, 1 had peritoneal secondaries, 1 secondary deposits in the brain). The remaining 7 are alive and well, the longest survival being nearly four and a half years.

It will be seen that in 29 cases the 8 bad results have been confined to proved C cases. The question of the eradication of the disease in such cases by a combined excision is one which we are actively investigating in St. Mark's Hospital. I believe there are grounds for saying that in the C group there will certainly be a number whose disease can be eradicated by a combined excision when a perineal excision would be inadequate.

3. *The length of bowel removed.*—By perineal excision the average length of bowel excised is not more than 9 inches; in many cases, owing to the difficulty in mobilising the rectum, the length is not more than 6 or 7 inches. By a combined operation such as the one now to be described an average length of bowel removed (anus to iliac colon) is 18 inches. The importance of this is in regard to the frequent incidence of adenomata above the main tumour, and to the not so rare occurrence of double malignant growths. During 1933 I had the unusual experience of finding double carcinomata in 3 out of 12 long specimens removed by perineo-abdominal excision. These are shown in Fig. 1; in each case the second tumour was not diagnosed before operation; it was found at a considerable distance, varying from 5 to 12 inches, above the rectal growth, and would certainly have not been removed by perineal excision. Examples such as these provide a good explanation of certain cases of intrapelvic "recurrence" after perineal excision.

4. *Difficulty of establishing a colostomy in continuity* ("*loop colostomy*").—A colostomy in continuity, which is a necessary preliminary to perineal excision, is occasionally a difficult or unsatisfactory procedure; in stout subjects or in those with a short pelvic mesocolon it may be impossible to bring a loop of pelvic or iliac colon to the surface without tension. There is subsequently a persistent tendency to colostomy retraction. The alternative of doing a transverse colostomy is not at all desirable in view of the long blind length of colon which remains after perineal excision. There is no doubt that in stout subjects the terminal colostomy which is left after a combined excision is both easier to establish and is more satisfactory subsequently; it cannot be affected, as is the loop colostomy, by "spur retraction."

5. *Other dangers or drawbacks of perineal excision.*—In subjects with a fat-laden pelvic colon it is often a difficult matter to effect a sound closure of the bowel in the course of a perineal excision; the formation of a mucous fistula into the perineal wound is a common and tiresome complication, which may be due, as mentioned above, to operative difficulties, or subsequently to the cutting out of the sutures closing the bowel; to poor healing capacity; or to the presence of fæcal masses in the pelvic colon distal

out. The pedicle is divided between the ligatures, and for additional security a second ligature is tied round the upper cut end of the vessels.

4. A left iliac muscle-splitting incision 4 inches in length is made, with some cutting across the fibres of the internal oblique. The iliac colon is brought out and the space lateral to the iliac colon is closed by a running atraumatic catgut suture. The rectum and pelvic colon are passed through this incision up to the stitch closing the lateral space. (Fig. 3.)

5. The pelvis is now empty and closure of the pelvic floor is a very easy matter, using a double No. 1 catgut stitch on a curved needle ; no mobilisation of the flaps is required as a rule, and a running suture is made extending back from the posterior aspect of the bladder or uterus, and eventually burying the ligature round the inferior mesenteric vessels. (Fig. 4.) The appendix is removed if it looks at all unhealthy, and the great omentum is pulled down. The paramedian incision is closed without drainage, and the left oblique incision is closed in layers round the emerging colon.

6. The pelvic mesocolon is now ligated about 1½ inches external to the skin, gauze dressings are applied, and the bowel is divided at the same level by a cautery in between clamps. The specimen of the rectum and pelvic colon is now removed, the division being in this way carried out as an extra-abdominal manœuvre. The crushed edges of the emerging colon are separated, and a No. 17 rubber catheter passed down and sutured in. Five ounces of warmed olive oil may with advantage be run through the tube with the object of being retained and lubricating the colonic mucous membrane; easier passage of flatus may in this way be promoted.

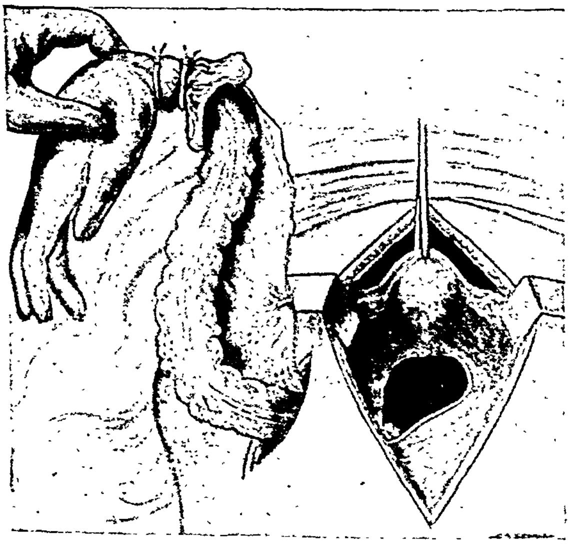

FIG. 3.—After ligation of the inferior mesenteric pedicle the mobilised rectum and pelvic colon are brought out of the abdomen through a left iliac incision. (Semidiagrammatic with omission of details of towels and packs.)

7. The median abdominal incision is sealed with gauze and Elastoplast. Finally the legs are held up by an assistant on each side, and the toilet of the perineal wound is completed ; the wound is swabbed dry and hæmostasis verified ; a sterilised yellow rubber bag (made for anæsthetic purposes by the Dunlop Rubber Company) is inserted and packed with gauze. The anterior third of the perineal wound is sutured and dressings are applied by lifting the patient and not by rolling him.

The only modification in the foregoing description which needs mentioning is that in 13 cases I have dispensed with the preliminary laparotomy and have done the operation as a "blind" one-stage perineo-abdominal excision. The cases selected for this have been those in which a clearly mobile and certainly operable carcinoma has been present, with the entire length of the tumour within reach of the finger. Although this method may be criticised on the score of possible liver secondaries being present, I do not believe it to be a valid objection. The passing of a hand over the surface of a liver and finding it smooth does not by any means exclude the presence of central secondary deposits, and if the operator has experience in assessing operability, I believe the blind operation is valuable—it saves both time and a turn. I have not yet found my pre-operative estimate belied by local fixity, or peritoneal or liver secondaries. I should not on any account advise this blind operation for a high constricting or deeply ulcerated carcinoma ; in these cases abdominal exploration is imperative.

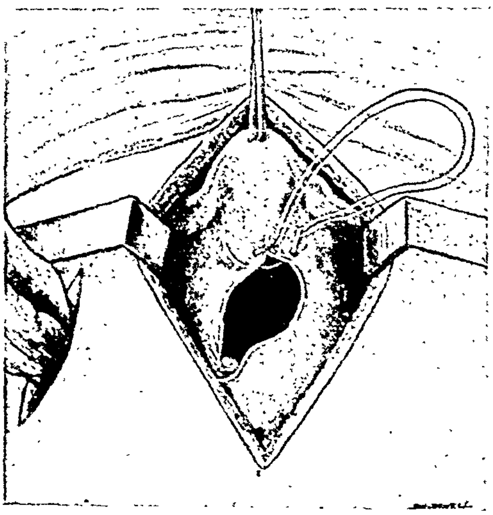

FIG. 4.—Closure of the pelvic peritoneum.

In view of the risk of sepsis in the abdominal wall I have abandoned perineo-abdominal excision as a second stage after a preliminary colostomy operation. In most cases, by suitable preparation, the bowel can be rendered empty and fit for a one-stage operation. If in the case of a constricting carcinoma in the recto-sigmoid region a preliminary drainage operation seems imperative, a cæcostomy would appear to be preferable. I have done this in a recent case, followed by perineo-abdominal excision, with a very satisfactory result.

Subsequent treatment.—The foot of the bed is raised on medium blocks for 24 to 48 hours. An intravenous injection of saline with 5 per cent. glucose (20–30 oz.) is given after operation, and may with advantage be repeated daily for the next two or three days. The gauze packing is removed from the perineal bag on the second post-operative day, and the bag itself is taken out on the next day. The perineal wound is then irrigated and dressed with eusol morning and evening, and usually heals very quickly. The sutures are removed from the perineal wound on the sixth or seventh day. There are no other details of any importance to record ; the post-operative course has usually been singularly smooth and free from anxiety.

to perform provided the operator has the experience which enables him to do a neat perineal dissection; it overcomes the serious difficulties of a narrow male pelvis, especially in those cases with a large tumour at the rectosigmoid junction; the dangers of sepsis and shock are largely eliminated—the former by avoiding intraperitoneal section of the colon, and shock by doing the perineal part of the operation first, so that no turning of the patient is required after completion of the abdominal operation. It fulfils all the requirements of a radical operation in regard to high section of the vascular and lymphatic pedicle; in regard to the length of bowel removed, I believe it is slightly more radical than Miles's operation, for the entire length of the rectum and pelvic colon up to the left iliac colostomy is removed.

In many of the classical operations of a radical nature, such as gastrectomy, nephrectomy, ovariotomy, it is an accepted principle to mobilise the part to be removed, and then to use it as a steadying agent by which a little traction may be applied, if required, until the vascular pedicle has been secured by transfixion and ligation, whether by use of an aneurysm needle or other form of ligature carrier. This principle is employed in perineo-abdominal excision and enables the operator to ligate the inferior mesenteric artery between the first and second sigmoid branches, which will free the entire pelvic colon for removal.

Preparation of the patient.—It is advisable that the patient should rest in bed for 7 to 10 days before operation, and much has to be done in this time.

(1) His cardiac condition and blood pressure will be estimated, and if necessary small doses of digitalin, such as Nativelle gr. 1/600 twice daily, may be indicated. (2) The urine excretion and blood-urea will be measured, and forced intake of fluids by the mouth will be encouraged. (3) Glucose in the form of barley sugar or glucose with lemonade or barley water will be given daily. (4) Smoking will be restricted and deep breathing encouraged. Dental sepsis will be attended to. (5) The diet will be of a non-residue nature, and the bowels will be cleared by aperients. Mag. sulph. may be given on two or three days in the amount of 1 drachm in water hourly for three or four doses; this will render the motions fluid and should eliminate any fæcal impaction above the growth. A simple enema is given on the night before operation, and a rectal tube is passed on the morning of operation. It is important that no free fluid should be present in the rectum at the time of operation. (6) In order to promote and maintain bowel tone, 0·5 c.cm. of Pitressin is given hypodermically one hour before operation, and is continued at four-hourly intervals for the first two or three days after operation.

Anæsthesia.—Although a few of these operations have been done under spinal anæsthesia, it is my firm conviction that my patients have done better under general anæsthesia, with novocain infiltration of the rectus muscles, than they have under spinal anæsthesia, or a combination of spinal and general anæsthesia. The operation as I do it takes two hours to complete, and a number of very frail patients have come safely through the operation under straightforward general anæsthesia (gas and ether, open ether, and in the latter stages, gas and oxygen), when I am sure that spinal anæsthesia would have been dangerous or even fatal. There have been two deaths on the table in stout subjects who had received a spinal injection; supplementary general anæsthesia was required while they were in the Trendelenburg position, and death took place imperceptibly, probably from a combination of lowered blood pressure with respiratory and cardiac failure. I feel sure that with general anæsthesia alone no difficulty would have been experienced. Quite a number of these cases have had a pulse-rate of 100 or more at the beginning of the operation, and at the conclusion two hours later, after general anæsthesia alone, the rate has slowed to 84–96.

Operative technique.—The operation of perineo-abdominal excision in one stage is carried out in the following distinct steps:—

1. For tumours in the upper third of the rectum, and for all tumours in the advanced or borderline category, an abdominal exploration is done through a right paramedian subumbilical incision. The liver, great omentum, and pelvis are examined in turn, and the operability of the growth confirmed before proceeding. The wound is closed temporarily by through-and-through silkworm gut sutures with an anchored gauze dressing.

2. *The patient is turned into the left lateral position,* the anus is firmly closed by two purse-string sutures of stout silk, and the perineal excision is proceeded with in the usual manner, *after disarticulation of the coccyx.* Before opening the peritoneum the anus and rectum are enveloped *in wet flavine gauze,* and a sterile glove is tied firmly over. After opening the peritoneum straight scissors are used to incise the peritoneum upwards on each side of the colon (about ½ in. distant), *for as far as possible.* (Fig. 2.) The rectum is mobilised laterally and posteriorly without encroaching on the superior hæmorrhoidal vessels, and is then pushed up into the pelvis. The posterior third of the perineal wound is sutured, a clean flavine pack is tucked into the remainder of the wound, and a sterile towel covers it. The patient is turned on to his back.

3. Trendelenburg position. The abdominal wound is reopened and small intestines packed out of the pelvis. The glove covering the rectum will now be seen and, as a rule, even in a narrow male pelvis, the rectum will be *readily delivered upwards.* The lateral incisions are continued upwards and with little difficulty the rectum and pelvic colon are stripped up till they are delivered freely out of the abdominal wound. The inferior mesenteric pedicle is now clearly defined by traction on the bowel, and the optimum point for application of a double silk ligature is made

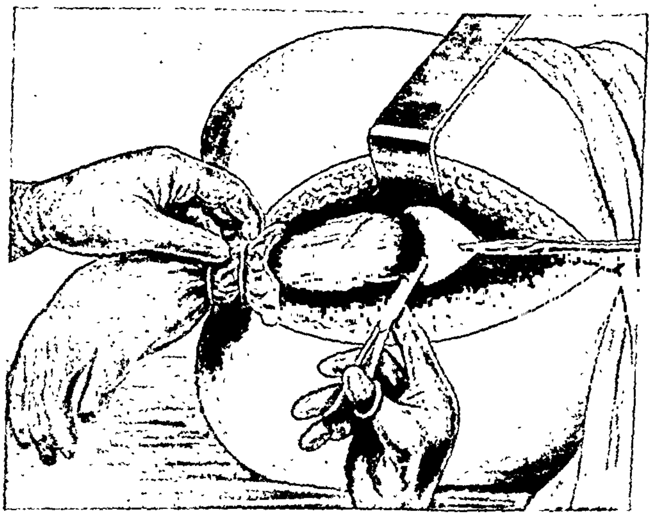

FIG. 2.—The perineal stage. The rectum is wrapped in a sterile glove and the peritoneum has been opened. The peritoneum is being incised upwards on each side for as far as possible.

a case by simple puncture after which the cyst disappeared and regular menstruation continued.

Lockyer mentions a case which developed a tense cystic swelling six months after operation in 1920. This proved to be a blood cyst. It was opened and scraped. Five months later another small cyst developed, but as it caused no inconvenience it was left alone. He has since carefully removed the cortex of the ovary before cutting grafts.

Blair Bell in a personal communication to Lack quotes two cases of cyst removal on account of metrorrhagia which ceased after their removal. The cysts were probably follicular and not lutein in origin.

Lack gives details of a case of excision of cysts five months after operation. There were two cystic cavities in a dense mass of fibrous tissue, one with a yellow lining. Pathological report: "Follicular cysts; one showing changes suggesting a modified lutein reaction."

Mayer: Case of engrafting in November, 1926. Periods commenced in January, 1927. A painful swelling developed in March, 1927, due to a cyst. It was punctured with good results till May, when it refilled. A second puncture proved unsuccessful, so in July the cystic graft was removed with relief of the abdominal pain but onset of climacteric.

Heynemann is quoted by Mayer. He states that he has been compelled to remove grafts on account of painful swelling. On removal, follicular and blood cysts were found. Details of cases are not given.

King: This case, which occurred in Australia in 1932, includes a detailed pathological report of several blood cysts occurring in a case where, I gather, the whole right ovary was transplanted, with its corpus luteum. Menstruation recurred normally, but a year after operation periodic pain and swelling of the graft necessitated its removal. Examination showed two large cysts and several smaller ones filled with chocolate-coloured material and altered blood. They are described as atretic follicles with one cyst containing degenerated luteal tissue.

DISCUSSION

In reviewing what has been written on this subject one is struck by the waning enthusiasm of the experts for homogeneous ovarian transplantation. The reports previous to 1917 are nearly wholly favourable, and praise the immediate and remote effects of autotransplantation (vide Lydston, Newton, Norton, and Phillips). Even Benthin is favourably impressed with the results, although most German authors, except Unterberger, seem to have had a good deal of trouble with their cases. Siegert in 1929, for instance, analyses nine cases as follows: in 5 no period occurred between six months and a year after operation; in 2 irregular losses occurred for a short time; and in 2 regular periods occurred after some months. In one case only was the result really satisfactory. In this patient the periods recommenced after five months.

After 1917 the American and German records become more despondent. Martin, who gives excerpts from most of the previous writers, and Graves comment on the failure of grafting in cases of total ablation of the uterus and appendages. The latter author even gives the opinion that retention of ovarian tissue after hysterectomy may be productive of serious harm to the patient. It is certainly of interest that the enthusiasts, mostly American, published their results within a year of implanting the grafts. Sippel, whose publications are too numerous to quote, denies the efficacy of ovarian grafts in preventing ablation symptoms. He finds that intraperitoneal grafts frequently cause metrorrhagia and are often productive of abscesses and cysts. This habit of intraperitoneal grafts to become cystic is confirmed by most authors and makes it seem still more curious that so few extraperitoneal cysts are recorded.

The consensus of opinion at the moment seems to be that grafts should not be implanted to prevent ablation changes, which rather limits their field of utility, but that they may occasionally benefit a case where the uterus has not been removed. There is quite a chorus of approval for grafting in cases of hypogenitalism and eugenic sterilisation, particularly from Lydston (quoted by Martin), who records successful heterogeneous grafts taken from the dead body *any time before decomposition set in!* (The italics and exclamation mark are mine.)

Recent work on autogenous grafts suggests that the pendulum is again swinging towards a favourable view. The latest European report of Cheval and Mayer is almost wholly favourable even in cases of total and subtotal hysterectomy. They state that the only portion of the graft which persists and develops is the superficial layer containing the germinative epithelium and primordial follicles, the centre merely necroses; thick grafts are therefore useless and peeling of the surface is inadvisable. The superficial layers should be preserved and handled carefully. Two or three grafts are placed either in the superficial part of the right rectus muscle under the aponeurosis or in the subcutaneous cellular tissue (preferably in the submammary furrow). Uterine grafts are also advocated. These are cut from the removed uterus after swabbing it with 5 per cent. iodine and dividing it into anterior and posterior halves. They should include the mucosa, submucosa, and a small portion of the muscle.

An analysis of the results of 32 cases gives the satisfactory report of "endocrine troubles were absent and menstruation conserved" in 70 per cent. It is further stated that for three months after the operation patients still suffer from all the troubles of the menopause; these attenuate and disappear when menstruation is re-established, which rarely occurs before the fourth and usually at the eighth month.

In the recorded cases of cystic changes in grafts, much discussion has occurred about the nature of the cysts. With two exceptions they all seem to have been simple follicular cysts containing straw-coloured fluid; the others contained blood and sometimes showed lutein changes. Without entering pathological territory I should like to suggest a possible common origin for all these cysts. In a normal ovary the Graafian follicle ruptures into the peritoneal cavity and discharges an ovum and a variable quantity of blood, sometimes sufficient to suggest a diagnosis of ruptured ectopic gestation. This is usually, except in extreme cases, easily absorbed by the peritoneum. The extraperitoneal graft has no convenient peritoneal cavity for this purpose, and the ova and products of the corpora lutea are presumably scattered about in the fascia and absorbed. Should absorption fail to occur a hæmatoma with a partial epithelial lining would be left. Subsequent degeneration of the granulosa cells and serum exudation would produce small cysts of a similar character to those described.

Some authorities advocate stripping the ovarian cortex before taking grafts as a method of preventing cyst formation. This would, of course, remove the germinal epithelium (Cameron), but it is difficult to see how it would prevent cystic degeneration unless these described are really multilocular cysts of cortical origin. If so, it may strengthen the theory of their development from the so-called "egg tubes" of Pflüger on which a certain discredit has been cast by former writers. If, however, Cheval and Mayer are to be believed, such decorticated grafts would

IMMEDIATE RESULTS

Since January, 1932, I have done this operation in one stage on 25 occasions (12 with preliminary laparotomy and 13 without). Three patients have been 70 or over and have recovered; the oldest was a man aged 77 who made an uninterrupted recovery after the operation. Two other notable recoveries have been the case of a stout woman of 40 who weighed 13 st.; and a minute little woman (70 years) who was only 4 ft. 8 in. high, and weighed 5 st. 11 lb. In 25 cases there have been 5 operative deaths; 2 deaths on the table which were due, I think, to an exceptional combination of circumstances; 1 death on the fourth day (male aged 69) was clearly due to cardiac failure with auricular fibrillation; and 2 occurred on the seventh day from a combination of small intestinal ileus and bronchitis; this happened before I had begun the prophylactic injections of pitressin.

The justification for the operation in these cases is that microscopical proof of metastases in the glands along the line of upward lymphatic spread has been obtained in 14 out of the 25 cases (56 per cent.). I am now restricting perineal excision to those cases of carcinoma of the anal canal or lower third of the rectum when the tumours are either very early, or so late that by reason of involvement of the vagina, prostate, or ischiorectal fossa, the extra risks of a combined excision do not appear to be justified.

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CYST FORMATION IN OVARIAN GRAFTS

WITH REPORT OF A CASE

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THE recorded cases of cyst development in extraperitoneal ovarian grafts are curiously few in number. Lack in 1924 was only able to find 2 cases specifically mentioned in the literature, one by Graves, who performed three operations for subsequent changes in a bilateral graft, the other by Blair Bell, who had 2 cases in a series of 150 grafts, the second of which, I believe, is still unpublished. A further case was reported by Lockyer after the above paper, making a total of 5 in all.

I was able, after a careful search, to augment this list by 2 cases quoted in some detail by Mayer. The first is probably the earliest recorded (Columbino, 1914), the second by Unterberger in 1919. This case is especially interesting because a cure followed simple puncture; most of the other cysts have given much more trouble. Since 1924 there appear to be three more case records. Here is the chronological table to date:

Columbino ..	1914	Lack	1923
Graves ..	*1915*	Mayer	1927
Unterberger ..	1919	Heynemann ..	1930
Lockyer ..	1920	King	1932
Blair Bell * ..	1920		

* Two cases.

The following case of my own in 1933, to the best of my knowledge, completes the list.

NOTES OF CASE

A married woman of 23 with one child aged 2 years, was admitted to the Victoria Hospital, Deal, in 1929. She complained of abdominal pain chiefly localised in the left iliac fossa of several months' duration with exacerbation of the pain at the periods. Examination showed enlarged and tender tubes which at the subsequent operation were found inflamed and adherent. The left ovary was involved in the inflamed mass and contained several cysts. Both tubes and this ovary were removed, the right ovary, which appeared normal, being left. The appendix had been removed several years before. Convalescence was uneventful, the patient leaving hospital *healed and free from pain.*

She consulted me again in November, 1931, with dysmenorrhœa and fairly severe abdominal pain, this time chiefly confined to the right iliac fossa and of the same type as her left-sided pain of two years before. In spite of various treatment she became worse and I readmitted her to hospital in July, 1932, for further operative treatment. As this almost certainly involved removal of the second ovary it was done with great reluctance, in view of the fact that the patient was a thin and extremely nervous type, quite the last case one would choose for an artificial menopause.

At operation the remaining ovary was found enlarged and cystic. The uterus showed nothing abnormal and was left alone, the ovary being cleanly removed. A section of the healthiest end was taken, about the size and shape of a shilling, and embedded between the left rectus muscle and the posterior sheath. An uneventful recovery followed, the patient leaving hospital a fortnight later. Her subsequent history is as follows: Periods (previously of 5/28 type) recommenced three months after operation, and were of a 5-14/28 type. The loss was not excessive even in a prolonged period, and no pain was felt in the region of the graft although some tenderness and enlargement occurred at these times.

In December, 1932, flooding commenced and periods became more regular and of a 10/28 type with one curious exception. A hot-water bottle applied to the now definite swelling in the left rectus muscle always produced a "period" the next day. Pressure or injury to the abdominal wall had no such effect.

In October, 1933, she again sought admission to hospital for relief of excessive flooding and a very painful and tender swelling about the size of a hen's egg in the region of the graft. She volunteered the information about the curious effect of the hot-water bottle applications, and stated that the pain was exactly similar to her previous ovarian pain but much more superficial. Pressure on the lump made her feel sick. An experimental application of the hot-water bottle produced a "period." During this a small incision was made under Evipan anæsthesia and the swelling found to be a bilocular cyst filled with clear straw-coloured fluid, the two parts being about 1 in. and ½ in. respectively in diameter. Small pieces of the cyst wall were removed for microscopy. Subsequent pathological report confirmed these to be normal ovarian tissue.

The patient is now free from pain again and has had a normal but scanty period (December, 1933) without pain in the uterus or site of graft. She is still thin and nervous, but otherwise in good health.

PREVIOUS CASES

The previous cases may be briefly summarised:—

Columbino in 1914 was forced to remove an extraperitoneal graft because local disturbances occurred. Corpora lutea were present and three-quarters of the whole graft was cystic.

Graves removed cystic ovarian tissue in *1914 from fat* on the left side of an abdominal incision. A *bilateral graft had been done six months before.* A month later he removed similar tissue from the right side and eighteen months later removed still more cystic material from the left side.

Unterberger records a case in 1919 in which he treated

TABLE I

SHOWING THE MAXIMAL FINDINGS OBSERVED IN FRACTIONAL TEST-MEALS AFTER FEEDS OF RAW AND BOILED MILK

Case.	Sex.	Age in mos.	Free HCl.		T. acidity.		T. chlorine.		Peptic acidity.		pH.		Curd.	
			R.	B.	R.	B.	R.	B.	R.	B.	R.	B.	R.	B.
1	M.	3	16·7	11·10	25·0	45·0	64·6	56·6	28·9	44·1	4·0	4·2	+ +	+
2	M.	4	Nil.	11·12	27·8	43·7	96·1	70·7	8·1	22·5	4·5	2·4	+ + +	+ + + +
3	F.	7	,,	9·2	66·7	61·2	65·9	95·0	32·4	36·1	6·8	3·5	+ +	+ + +
4	M.	8	,,	Nil.	36·1	55·6	54·5	59·9	62·5	19·6	5·2	4·9	+ +	+ + +
5	M.	8	5·0	,,	47·0	50·0	79·8	70·9	8·1	6·4	3·4	3·8	+ +	+
6	M.	9	Nil.	,,	61·2	46·7	77·9	67·0	6·4	22·5	4·4	3·5	+ + +	+ +
7	M.	9	,,	,,	66·7	44·5	62·2	57·6	78·4	44·1	4·6	3·9	+ +	+
8	M.	12	10·0	10·0	63·3	80·0	88·9	87·4	25·6	78·4	3·4	3·0	+ + +	+
9	M.	14	22·24	11·12	66·7	51·1	75·1	74·5	22·5	14·4	2·3	2·3	+ +	+ + +
10	F.	16	Nil.	Nil.	55·0	65·0	64·6	65·6	57·6	22·5	4·0	3·6	+	+ +
11	M.	18	,,	,,	38·9	44·5	57·6	64·3	8·1	6·4	4·6	4·4	+ +	+ +
12	M.	18	4·45	5·56	46·7	40·0	70·2	69·1	32·4	3·6	3·2	3·4	− − +	− +
13	M.	18	20·0	Nil.	57·8	55·6	74·5	72·9	16·9	6·4	2·3	4·2	+	+ + +
14	M.	20	20·0	20·0	64·5	61·2	65·3	72·4	48·4	25·6	2·1	2·2	+	+ +
15	M.	23	Nil.	Nil.	50·0	55·6	75·5	86·7	32·4	16·9	4·4	4·4	+	− +
16	F.	23	,,	,,	33·4	37·8	55·1	58·9	36·1	25·6	5·7	5·2	+ + +	+ + + +
17	F.	23	,,	,,	50·0	70·0	81·0	80·1	25·6	16·9	3·0	4·2	+ + + +	+ + +
Mean ..		..	5·9	4·6	50·40	53·38	69·50	71·74	31·2	24·2	3·99	3·71	—	—

R. = raw milk; B. = boiled milk; T. = total.

RATE OF EMPTYING

The amount of curd varied considerably, but in 9 cases it was more abundant with boiled milk and in 7 with raw milk. In 1 it was about equal in amount with both types of milk. In 13 tests with raw and 14 with boiled milk there was obvious curd at the end of two hours, while in 4 with raw and 3 with boiled milk the two-hourly specimens were free of curd. In the majority of cases, therefore, the stomach was over two hours in emptying with both types of milk, which confirms the findings of Wills and Paterson,[5] who state that the stomach empties in two and a half hours in artificially fed infants.

PEPTIC ACTIVITY

The maximum peptic activity was higher with raw milk in 13 cases and with boiled milk in 4 cases, but there was a wide variation between the values in each ranging from 6·4 to 78·4 for raw milk with a standard deviation of 20·6, and from 3·6 to 78·4 for boiled milk with a standard deviation of 18·3. The average maximum for raw milk was 32·6 and for boiled milk 24·2. In view of the wide dispersion the difference between the averages cannot be considered significant.

SOLUBLE CALCIUM

The soluble calcium was estimated in 13 cases. It was low in the fasting juice and generally rose to a maximum within the first hour. In some cases there was a fall before the end of the second hour, while in others the value still remained high. With raw milk 4 showed the fall at two hours, while with boiled milk this was observed in 4 cases. In all, excluding the fasting specimens, 47 pairs of samples with raw and boiled milk were examined, and of these 30 showed a higher value with boiled and 17 with raw milk. The average of the maximal figures for raw milk was 52·4, and for boiled 62·0, which suggests that the calcium is better held in solution when boiled milk is used. But the maximal figures for raw milk ranged from 33·3 to 80·3 with a standard deviation of 12·5, and from 27·3 to 91·4 with a standard deviation of 18·1 for boiled milk; hence little importance can be attached to this difference in the averages.

TABLE II

SHOWING CHANGE IN SOLUBLE CALCIUM IN FILTERED GASTRIC CONTENTS AT HALF-HOURLY INTERVALS AFTER FEEDS OF BOILED AND RAW MILK

Case.	Sex.	Milk.	Calcium mg. per 100 c.cm.				
			Fasting.	½ hr.	1 hr.	1½ hrs.	2 hrs.
16	F.	R.	1·4	80·3	39·5	38·6	38·0
		B.	34·6	88·8	56·3	—	52·9
3	F.	R.	5·8	50·4	40·6	34·8	19·2
		B.	6·6	59·9	62·1	66·1	30·0
12	M.	R.	1·7	23·6	33·3	19·2	32·9
		B.	2·7	52·6	17·8	31·8	44·8
2	M.	R.	0·53	42·6	60·5	59·2	65·9
		B.	2·6	56·8	67·0	79·3	33·0
13	M.	R.	6·3	48·7	37·1	37·1	34·8
		B.	1·1	91·4	50·4	59·0	65·3
9	M.	R.	1·3	55·9	57·3	49·8	45·8
		B.	3·1	68·6	70·0	66·2	8·8
11	M.	R.	5·6	37·0	37·5	37·6	16·7
		B.	11·7	46·6	40·5	36·3	41·8
10	F.	R.	3·4	38·9	56·4	54·4	63·6
		B.	3·9	43·8	49·3	52·4	57·1
1	M.	R.	—	37·0	34·6	—	—
		B.	—	73·0	41·5	—	—
15	M.	R.	9·3	40·5	46·9	37·2	24·8
		B.	45·7	33·4	39·7	36·9	—
4	M.	R.	2·4	46·4	57·2	52·8	24·0
		B.	9·4	48·0	52·2	64·8	—
6	M.	R.	—	50·4	55·6	58·8	54·4
		B.	8·4	16·0	23·2	27·3	26·4
14	M.	R.	1·6	46·0	34·8	32·8	84·1
		B.	4·4	44·7	49·8	49·4	23·0

R. = raw milk; B. = boiled milk.

TABLE III

SHOWING CHANGE IN NON-PROTEIN NITROGEN IN FILTERED GASTRIC CONTENTS AT HALF-HOURLY INTERVALS AFTER FEEDS OF BOILED AND RAW MILK

Case.	Sex.	Milk.	Non-protein nitrogen mg. per 100 c.cm.				
			Fasting.	½ hr.	1 hr.	1½ hrs.	2 hrs.
16	F.	R.	40·2	62·5	48·1	14·7	30·6
		B.	39·6	60·5	40·0	8·6	19·8
3	F.	R.	67·5	58·7	58·8	90·9	181·8
		B.	66·6	106·3	166·6	222·2	111·1
12	M.	R.	35·3	66·6	47·6	8·2	39·2
		B.	36·5	65·2	47·8	12·5	28·9
2	M.	R.	100·0	69·5	100·0	126·9	145·4
		B.	97·5	100·0	126·9	145·4	125·0
13	M.	R.	82·6	97·08	117·5	133·3	106·3
		B.	80·9	68·9	93·0	103·0	136·9
9	M.	R.	46·7	66·6	71·4	71·4	71·4
		B.	46·7	43·6	90·9	181·8	181·8

NON-PROTEIN NITROGEN

The amount of non-protein nitrogen was very constant in the fasting juice of each of the six cases examined. In four the values for raw and boiled milk were very close inevitably die and therefore cyst development would be aborted.

Should cysts occur in a graft removal appears to be the best treatment; in one case only has a cure followed simple puncture. All authorities agree that extraperitoneal implantation is simple and free from danger in selected cases, also that no recorded changes of a malignant character have yet occurred.

I should, in conclusion, like to thank Mr. T. J. Shields, the librarian to the British Medical Association, for his very considerable assistance with the references.

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GASTRIC DIGESTION OF RAW AND BOILED MILK IN INFANTS

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AND

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THERE is still much discussion on the relative digestibility of boiled and unboiled cow's milk. Graham and Morris [1] found that in infants the protein, fat, and minerals of boiled and unboiled milk were equally well absorbed. M. Andross [2] concluded from in-vitro experiments that pasteurisation, and to a greater extent boiling, renders the protein of milk less readily digested by pepsin and trypsin. Stirling and Blackwood,[3] in their comprehensive monograph, reviewed the results of previous experiments on the digestion of boiled and unboiled milk, and state that these results were very conflicting. At any rate, the results of in-vitro experiments must be applied with caution to the course of digestion in the living subject where the conditions are clearly different, for in these the amount and composition of the gastric secretion may be altered in response to different types of food.

From the practical point of view, therefore, it seemed advisable to study on the infant the effect of boiling on the gastric digestion of milk. For this purpose the gastric contents were removed before and at half-hourly intervals after test-feeds of raw and boiled milk. The following were used as indices of the course of digestion.

(1) The amount of free hydrochloric acid and total chlorine, and the degree of total acidity. This was done since the reaction of the gastric juice is of considerable importance in the digestion of proteins and the utilisation of minerals.

(2) Peptic activity, to determine whether any change in the physico-chemical composition of the milk alters the secretory activity of the zymogen glands.

(3) Soluble non-protein nitrogen as an index of the extent to which proteins are disintegrated.

(4) Soluble calcium as an indication of the capacity of the gastric secretion to convert minerals into a soluble and therefore a readily assimilable form.

The last two were specially chosen because of the frequently reiterated claims [3 4] that the main drawback of boiled milk is that changes occur in the nature of its calcium and nitrogenous constituents, rendering them less susceptible to the action of gastric juice.

Fractional test-meals after raw and boiled milk were carried out on 17 infants whose ages ranged from 3 to 23 months, and who had recovered from the various diseases for which they had been admitted to hospital and who appeared healthy at the time when the tests were performed. The test-feeds consisted of boiled or raw milk in amounts varying with the age of the subject; the gastric contents were examined before and at half-hourly intervals for two hours after the feed.

The amount of curd was noted in each specimen which was then filtered through glass wool. The free hydrochloric acid, total acidity, and total chlorine of the filtrate were estimated by the usual methods, and the pH of each specimen determined by means of the B.D.H. capillator. A measure of the peptic activity was obtained by the Mett's tube method; the amount of egg-white digested after incubation for 24 hours was measured in millimetres, and the figure obtained taken as an index of peptic activity. The proteins were removed by the addition of 9 c.cm. of 15 per cent. trichloracetic acid to 1 c.cm. of filtered gastric contents. The precipitate was filtered off and the filtrate used for determining the non-protein nitrogen by the micro-Kjeldahl method. The soluble calcium was estimated by a modification of Kramer and Tisdall's method. The results are given in detail in the Tables.

ACIDITY

The pH varied between 6·8 and 4·6 in the absence of free acid, but was as low as 2·1 when free hydrochloric acid was present. The difference (0·28) between the average maximum for raw and boiled milk (3·99 and 3·71 respectively) was not significant. Wills and Paterson [5] state that the average pH for normal infants on cow's milk is 3·5, but they do not state whether the milk was boiled or not.

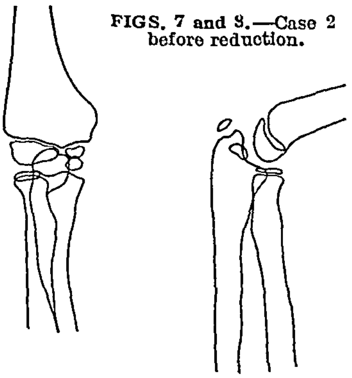
No free hydrochloric acid was found in either test in 8 cases (47 per cent.), while in 4 the maximum was higher with raw milk, in 3 with boiled milk, and in 2 it was the same in both. The average maximum figure was higher with raw milk, being 5·9 c.cm. N/10 NaOH for raw and 4·6 c.cm. N/10 NaOH for boiled, but the difference (1·3) was too small to be significant. There was very little difference in the maximal total chlorine of the gastric contents with raw and boiled milk. Actually there was only a difference of 0·5 milli-equivalents per litre between the average maxima.

The percentage maximum total acidity for raw milk varied from 25·0 to 66·7 c.cm. N/10 NaOH with a standard deviation of 4·3, and for boiled milk from 37·8 to 80 c.cm. N/10 NaOH, with a standard deviation of 3·8. In 10 cases the maximum was higher with boiled and in 7 with raw milk. The average maxima were 50·4 for raw and 53·4 for boiled milk; the difference, 3·0, however, was not found to be statistically significant.

It is obvious that there is no significant difference in the behaviour of either free hydrochloric acid or total acidity of the gastric juice with raw and boiled milks.

I decided to attempt manipulative reduction before resorting to open operation. Under nitrous oxide anæsthesia the forearm was strongly abducted at the elbow so as to open the inner side of the joint. This released the "sandwiching" of the epicondyle, and during flexion and extension movements of the elbow the epicondyle was felt to slip out of the joint. If the forearm is kept supinated and the fingers are extended, tension is exerted on the common flexor origin and this may aid reduction. Fig. 5 is a tracing of a radiogram taken with the elbow flexed after reduction. This shows good apposition of the epicondyle to the humerus and it is lying in its normal position.

The elbow was immobilised in flexion for three weeks, and after this movements of the elbow were allowed to return naturally without any special treatment. Commencing recovery of the ulnar nerve lesion was noted on Sept. 7th, and the elbow movements on this occasion were full in flexion and radio-ulnar movements, and extension was possible to 180°. The final condition (Jan. 4th, 1934) was as follows: ulnar nerve lesion completely recovered; elbow movements, flexion, and radio-ulnar movements normal; extension 180° (normal side 190°); no symptoms. Radiogram (Fig. 6) shows fibrous union with displacement of the epicondyle downwards from its normal position. This is a common sequel of fractures and epiphyseal separations of the epicondyles and has not prejudiced function in this case. It is possible that extension movements of the elbow were allowed too early in this case and consequently union of the epicondyle prevented.

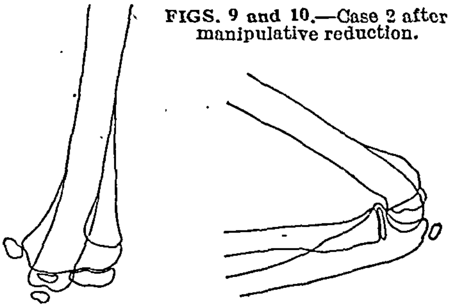


FIGS. 7 and 8.—Case 2 before reduction.

Case 2.—A boy, aged 10, was seen by me on Dec. 16th, 1933, having fallen two days previously and injured his left elbow. There was considerable swelling round the elbow and tenderness localised over the internal aspect of the lower end of the humerus. There was no circulatory disturbance but a definite ulnar nerve lesion was present. X rays (Figs. 7 and 8) show displacement of the internal epicondyle into the joint, the appearances being almost identical with those of Case 1. I manipulated the elbow in the same manner as in Case 1 and during manipulation the epicondyle was felt to slip out of the joint. X rays (Figs. 9 and 10) show reduction of the displacement. The epicondyle is lying slightly higher up the shaft of the humerus than its normal position. This case is still under treatment. There is limitation of the last 20° of extension and a partial ulnar nerve lesion persists. An anterior transposition of the ulnar nerve will be necessary if the nerve lesion does not recover completely in the next month or two.

Case 3.—On searching the records of the Liverpool Royal Infirmary for fracture cases for the last seven years I was able to find twelve other cases of displacement of the internal epicondyle into the elbow-joint. With one exception these had all been treated by open reduction of the displacement, and in most cases an anterior transposition of the ulnar nerve. One case, however, had been successfully reduced by manipulation. This case belongs to the first category described above in which a gross outward dislocation of the elbow is present. Figs. 1 and 2 illustrate the appearances in this case. Mr. A. L. Kerr saw the patient on Sept. 11th, 1928, and the displacement of the epicondyle was reduced by manipulation only. The ulnar palsy recovered completely in three months, and the final condition was: good function in the elbow with 15° of limitation of full extension.

Case 4.—A man, aged 22, fell off his horse while riding on Dec. 2nd, 1933, and was seen by Mr. R. Watson Jones the same day. There was an outward and backward dislocation of the elbow present and the internal epicondyle had been avulsed and was lying below the trochlear surface of the humerus. The dislocation was reduced by Mr. Watson Jones by manipulation and the epicondylar fragment restored to its normal position. There was no nerve lesion in this case. With a view to preventing fibrous union of the epicondylar fragment, the patient was operated on on Dec. 19th and the epicondyle sutured accurately into position.



FIGS. 9 and 10.—Case 2 after manipulative reduction.

SUMMARY

(1) Four cases are described in which displacement of the internal epicondyle into the joint has been reduced by manipulative measures alone. (2) There is no reason to suppose that recovery of the ulnar nerve lesion or the ultimate function of the elbow will be prejudiced by this line of treatment. (3) Stress is laid on the importance during manipulation of opening the inner side of the joint so as to allow the internal epicondyle to retrace its original displacement. (4) In the absence of operative treatment there is the possibility of fibrous union of the epicondyle occurring but this is of no importance. (Fibrous union of the epicondyle also occurred in two cases which had been submitted to open operation and in which the epicondyle had been sutured in its correct position.) (5) It appears likely that attempted manipulative reduction will be successful in a high proportion of cases seen within the first few days, and the necessity for open operation avoided, with consequent shortening of convalescence and avoidance of any possible complications.

I am indebted to Mr. Watson Jones for the notes of the fourth case in this series and for his kind permission to publish the other three cases.

Middlesex Hospital.—The annual report records that 7987 patients were admitted last year, whose average weekly cost was £4 13*s*. 4*d*. Their average stay was 20·38 days, and their total cost £13 11*s*. 9*d*. Out-patients numbered 47,995, and their 264,911 attendances were a large increase. They cost 9*s*. 7·94*d*. each. The year closed with a surplus of £3512, which is accounted for by the unusual sum received from legacies. Dr. W. Essex Wynter, consulting physician to the hospital, has rounded off his gift of Bartholomew Manor, Newbury, as a home for retired Middlesex Hospital sisters and nurses, by the purchase of two more ancient cottages which he has restored and put into use. Eleven former sisters and nurses now have their homes there, and others are shortly to join them.

at each half-hour period. In the other two the values for boiled milk were greater, showing that its protein had been more rapidly digested than that of raw milk.

Of the 24 pairs of half-hourly samples for raw and boiled milk half showed higher values with boiled and half with raw milk, so that there is no evidence of better gastric digestion of the protein of raw milk than of boiled milk.

It is clear from these results that there is no significant difference in the gastric digestion of boiled and raw milk, and it may be concluded that digestion of milk is not adversely affected by boiling.

We desire to thank Prof. G. B. Fleming and Dr. N. Morris for suggesting this investigation and for their helpful criticism. The work of one of us (J. W. O.) was done during the tenure of a McCunn medical research scholarship.

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DISPLACEMENT OF THE INTERNAL EPICONDYLE INTO THE ELBOW-JOINT

FOUR CASES SUCCESSFULLY TREATED BY MANIPULATION

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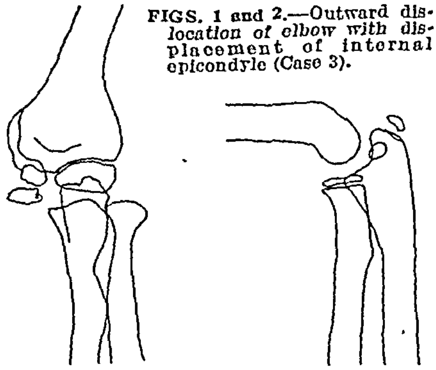
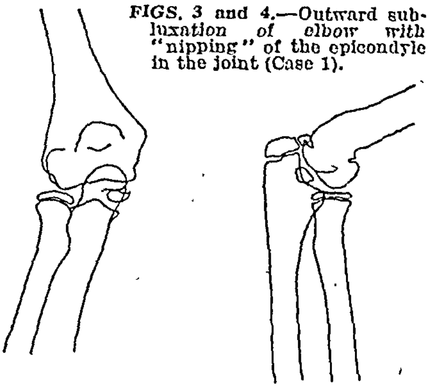
THE following cases are recorded in order to draw attention to the possibility of successful manipulative reduction of displacement of the internal epicondyle into the elbow-joint. This condition is not very common but probably is not as rare as is supposed.

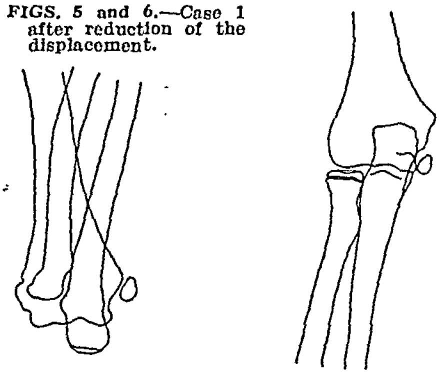
A simple separation of the internal epicondyle without dislocation of the elbow is a common injury in childhood and is due to indirect violence acting through the common flexor origin and other soft tissues on the inner side of the elbow. If the violence is more severe a pure outward dislocation of the elbow or a combined outward and backward dislocation results. The former always results in an ulnar nerve lesion and is the type in which imprisonment of the detached epicondyle in the joint is most likely to occur. Two degrees of displacement are met with clinically.


FIGS. 1 and 2.—Outward dislocation of elbow with displacement of internal epicondyle (Case 3).

1. A gross outward dislocation of the elbow exists. The epicondyle is pulled downwards and then outwards by the attachment of the common flexors until it lies below the trochlear articular surface of the humerus (Figs. 1 and 2, Case 3). In this type of case manipulative reduction of the dislocation may displace the epicondyle out of harms way. Alternatively, as the dislocation is reduced, the epicondyle becomes wedged between the trochlea and the sigmoid cavity of the ulna, producing a picture essentially similar to the second type of case.


FIGS. 3 and 4.—Outward subluxation of elbow with "nipping" of the epicondyle in the joint (Case 1).

2. In this type there is a slight outward subluxation of the elbow and the internal epicondyle is interposed between the articular surfaces of the ulna and humerus (Figs. 3 and 4, Case 1). There has probably been a dislocation of the elbow at the time of injury but spontaneous reduction has occurred. I have been unable to find any record of successful manipulative reduction of this type of displacement—chiefly I think because displacement of the epicondyle into the joint is associated in the minds of surgeons with operative reduction or removal, and consequently no attempt is made to reduce the displacement by manipulation. Two of the four cases recorded here belong to this type and have been successfully reduced by manipulation.


FIGS. 5 and 6.—Case 1 after reduction of the displacement.

CASE RECORDS

CASE 1.—A girl, aged 13, was seen by me on June 16th, 1933. On the previous day she had fallen, injuring the left elbow; the exact mechanism was not known. The elbow was very swollen and blistered and the diagnosis was not made clinically. There was a partial ulnar nerve lesion. Radiograms showed a displacement of the internal epicondyle into the joint. Tracings of the radiograms show the typical appearances (Figs. 3 and 4). In the antero-posterior view the internal epicondyle is seen with its fractured surface upwards lying in the space between the ulna and the trochlear epiphysis. In the lateral view it occupies the sigmoid cavity of the ulna.

after two and a half hours, 1 c.cm. of pure horse serum by the same route. The animal betrayed no abnormality and a post-mortem examination some three weeks later revealed healthy organs.

Familial investigation.—Both parents and the two other children of this family were submitted to skin tests with horse serum. Using a dilution of 1 : 100, there was no abnormal response in any case.

Specificity.—Final intradermal tests on the sensitive patient with the sera of the goat and cow in a dilution of 1 per cent. in the same buffer solution yielded reactions similar in nature to that obtained with horse serum, but more extensive in degree. This was particularly the case with goat serum, for the subsequent œdema was noted after six hours to cover the anterior half of the forearm with the exception of about two inches proximal to the wrist-joint. Three control patients had the cow and goat sera administered intradermally and showed no response.

DISCUSSION

Although the similarity of the events referred to in the early (1903–1907) studies of Richet,[4] Arthus,[5] and Theobald Smith [6] on animal anaphylaxis, and the researches of von Pirquet and Schick [7] on serum reactions in man, has led to a confused terminology, it has been evident that, as with immunity, there are two types of supersensitiveness, the one artificial and the other natural.[8]

According to Lamson,[9] the onset of serious symptoms of shock following horse serum injection is much more common in patients who have not been artificially sensitised by previous serum injection and who manifest their idiosyncrasy by some form of horse intolerance. Little experimental work has been carried out on the naturally supersensitive, and hence it has been assumed from work done on artificially sensitised individuals that desensitisation is possible and that the condition is specific. Mackenzie and Hanger [10] have pointed out that desensitisation of the naturally supersensitive individual had not yet been shown to be easily possible, while the case reported by us seems at least to throw the assumed specificity of natural supersensitiveness open to question. Mackenzie [11] has noted heterologous skin reactions with other sera in individuals sensitised to horse serum, and in our case the reactions with other sera were equally or more severe. The observations of Prausnitz and Kustner [12] and of Cooke and Spain [13] regarding the transference of sensitiveness have been corroborated.

The patient was evidently supremely sensitive, for the acute symptoms appeared within three minutes of the intramuscular injection. Would it have been possible to detect this sensitiveness in advance, and can we be certain that the reactions developing after the intradermal administration of horse serum, injected days after the therapeutic serum had been given, would have shown themselves had the patient been tested on admission? We shall never know. Nor are all writers convinced that the intradermal method would have given warning in advance. Some authors have suggested that a minute dose of serum should be administered by the route to be used for the main injection. In view of the intense anaphylactic shock this child showed, we think it highly probable that a preliminary intramuscular injection of even a minute dose of serum would have caused symptoms striking enough to warn us that the child belonged to this dangerous group. What then? Presumably we should have no option, if we decided to continue serum to the required therapeutic dose, but to give a long series of divided doses [14] commencing with perhaps 0·05 c.cm. of serum and increasing cautiously, keeping 1 c.cm. of adrenaline available for instant injection if troublesome symptoms appeared.

SUMMARY

We report a case of severe anaphylactic shock following the first injection of horse serum, where success attended efforts to resuscitate a patient who would in our opinion certainly have died otherwise. The value of artificial respiration coupled with prompt administration of adrenaline is clearly demonstrated.

The tests applied to the patient in convalescence are interesting for the reason that, while they confirm certain experimental work, they show that natural supersensitiveness is not necessarily specific.

We are indebted to Dr. R. A. O'Brien, of the Wellcome Research Foundation, for material help in the investigation and valuable suggestions and advice in writing this paper.

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BACILLUS TUBERCULOSIS IN BUTTER

A METHOD OF EXAMINATION

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There are certain technical difficulties in carrying out the biological test for the presence of *B. tuberculosis* in butter. The following method obviates some of these. All operations must of course be carried out aseptically and all apparatus, distilled water, and saline used must be sterile.

From 60 to 100 g. of butter are taken and melted at a temperature of 40° C. in 150 c.cm. of distilled water in a beaker. This is then pumped twice through a "cream making" machine into a centrifuge tube. It is next centrifugalised at 3000 revolutions per minute for half an hour. The cream is then removed with the aid of a stout wire, the supernatant fluid poured off, the deposit suspended in 5·0 c.cm. of saline, and inoculated subcutaneously in equal amounts into the antero-internal aspects of the right thigh of each of two guinea-pigs, the inguinal glands having been previously squeezed after the method of Bloch.[1] The animals are killed after a lapse of one month, and examined with great care for the presence of tuberculosis arising from the site of inoculation.

By this method 40 samples of Danish (15) and New Zealand and Australian (25) butter have been examined and the organism was found in one of the Danish samples. This is rather surprising, since these butters are usually believed to be made from cream which has been efficiently pasteurised. It is recognised that the butter may have been infected after production; but it is none the less disconcerting to those who use these butters principally because of their supposed freedom from infection with *B. tuberculosis.*

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SEVERE SERUM SHOCK

A CASE AND AN INVESTIGATION

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THE rare phenomenon usually called "anaphylactic shock" always attracts attention, because it is an unexpected and dramatic outcome of a simple procedure almost always performed without mishap. So rare, indeed, is it in humans that few practitioners ever see a case. It has been calculated[1] that the proportion of persons liable to show severe anaphylaxis is not more than 1 in 20,000.

THE CASE

At the beginning of May, 1933, five cases of scarlet fever were admitted to hospital within four days. The patients were children who attended the same class of an elementary school within the burgh. Inspection of the pupils of the affected class by one of us on May 8th elicited the source of infection to be a girl with the remains of the rash still visible. The patient, a well-nourished child of 8 years, was removed to hospital, and there 5 c.cm. of scarlet fever antitoxin (concentrated) out of a 10 c.cm. phial was injected into the muscle of the thigh. Three minutes later she suddenly began to have difficulty in breathing, and after struggling into a sitting posture with the arms held firmly to the sides and the hands clenched, gasped for breath. The colour became greyish-blue and the face distorted, with the mouth pulled to the right and the lips retracted over the teeth. The child was at once put on her back, but she writhed about on the bed and ultimately lay on her left side in a state of deep coma. Respiration was suspended and the colour became an extremely livid blue,[2] as in death from asphyxia. The pupils were contracted, but the pulse was full and bounding.

Treatment and course of illness.—At once artificial respiration was initiated with the jaw held forward and, in approximately one minute, a sighing type of respiration, attended by a rattle of mucus in the air-passages, was re-established for a few moments. The lividity of the skin, however, remained. The patient was at once given gr. 1/100 of strychnine sulphate and ♏ 8 of adrenaline solution hypodermically. Almost at once respiration ceased again, accompanied by a tonic spasm of all the muscles. The radial pulse became imperceptible, although the heart was felt to be beating tumultuously. Artificial respiration was recommenced, along with rhythmic traction of the tongue. The heart area was fomented, the mouth and lips rubbed with brandy, and the foot of the bed elevated about two feet. The patient voided urine during the asphyxial spasm. After a few minutes breathing of a more normal type became established, the livid colour began slowly to fade, and consciousness gradually returned.

The child remained dazed for half an hour afterwards and a degree of cyanosis was present for about two hours, while the radial pulse remained imperceptible for a similar period and then gradually grew stronger. The scarlatinal rash faded during the attack and began to reappear with the disappearance of the cyanosis. Subsequently the child was very thirsty but slept well during the night. Next morning she was rather pale, but her pulse was quite strong. There were a few urticarial weals on the abdomen. Progress after this was normal and free from other serum reactions, and the child was discharged from hospital on June 10th in perfect health.

Sera from the same batch had been used on other patients in this ward without any subsequent manifestations and, moreover, the remaining 5 c.cm. of serum in the 10 c.cm. phial opened for this patient was administered at the same time to another patient, whose clinical behaviour subsequently was entirely normal.

Previous history.—Apart from measles, whooping-cough, mumps, and influenza the child had enjoyed excellent health. She had had neither hay-fever, asthma, migraine, nor a previous injection of horse serum. No animal intolerance had been noted. Ordinary colds in the head were admitted, but no seasonal colds suggestive of hay-fever. Her own doctor corroborated this history.

THE INVESTIGATION

During convalescence attempts were made to inquire into the pathogenesis of this susceptibility and to evaluate the various modes of testing for the condition.

Scarification tests.—These were carried out, a week after admission, on the patient and two control subjects, one of whom had also previously had an injection of 5 c.cm. of scarlet fever antitoxin. The substances applied were undiluted ox, human, pig, and sheep sera, along with two samples of therapeutic horse serum from different makers. None of the three subjects showed any response. Two group-protein extracts (meat and bacteria) were similarly used without any reaction.

Conjunctival and intradermal tests.—Beginning on the twenty-first day, these were carried out on successive days on the patient and one other control subject, using varying dilutions of serum in a buffer solution of isotonic saline. The results are given in tabular form.

Material.	Method.	*Dose.*	Result.	
			Patient.	Control.
1. Buffer solution	Conj. Intrad.	2–3 drops. 0·1 c.cm.	Neg. ,,	} *Neg.*
2. H.S. (1 : 1000)	Conj. Intrad.	2–3 drops. 0·1 c.cm.	Neg. Sl. erythema and œdema.*	} Neg.
3. H.S. (1 : 100).	Conj. Intrad.	2–3 drops. 0·1 c.cm.	Neg. Marked weal, erythema and œdema.†	} *Neg.*
4. H.S. (1 : 10)..	Conj.	2–3 drops.	Neg.	Neg.
5. H.S. (pure) ..	Conj.	2–3 ,,	Neg.	Neg.

H.S.=horse serum; conj.=conjunctival; intrad.=intradermal; neg.=negative; sl.=slight.
* 1–6 hours after. † ½–6 hours after.

The reaction obtained on the patient following intradermal injection with horse serum in a dilution of 1 in 100 was the formation within half an hour of a marked weal with a surrounding zone of erythema of about 2 inches diameter, which gradually faded and was succeeded by a larger ovoid area of œdema reaching a maximum length of 3 inches within six hours afterwards. These changes are comparable with the triple reaction of Lewis.[3]

Transference of sensitiveness.—(*a*) Ten c.cm. of blood were withdrawn from the patient and allowed to coagulate; 0·1 c.cm. of the serum was injected intradermally into a second patient, who had previously been tested by the intradermal method and found insensitive. A latent period of 48 hours was allowed to elapse and the sensitised site was reinjected intradermally with 0·1 c.cm. horse serum in 1 : 10 dilution. A very mild erythema with local œdema lasting eight hours followed. A control injection into an untreated area of the skin gave no reaction. (*b*) An attempt was made to transfer the condition to guinea-pigs. (Dr. M. J. Miller, of Ayr County Laboratory, very kindly conducted this part of the test.) A guinea-pig was given an intradermal injection of the patient's serum and, after two hours, an intradermal injection into the same site of pure horse serum. There was no abnormal response. A second guinea-pig was given 1 c.cm. of the patient's serum hypodermically and, generations of mental nurses, and greatly enhancing the prestige of psychiatry. Until the war most of the practical improvements, discoveries, researches, and reforms in connexion with psychiatry emanated from mental hospitals; a galaxy of "asylum men," as they were called, brought honour to themselves and the specialty by their ability and devotion. But since the war a change had come about associated with two important developments. The first was the greatly increased attention devoted to research by a multiplicity of research workers. In most of the mental hospitals of any size the clinical and pathological laboratories and staffs compared most favourably with those of any general hospital in the country. Yet research in psychiatry at the present time bore, on the whole, far less relation to clinical work with and for patients than in any other branch of medicine, for pre-eminently in psychiatry the physician dealt with personalities. It should not be a question as to the results which "A" had collected, of "B's" investigation into the chemical properties of certain organs and tissues removed by "C" from 200 cadavers of persons who, in "D's" opinion, once suffered from schizophrenia. That had no message for clinical psychiatry. There was too great a gulf between research and the clinical phase of psychiatry. It was assiduously preached, and had become widely accepted, that not only was mental hospital experience needless for the training of the psychiatrist, but it was a waste of time, if not indeed harmful. The situation needed to be frankly faced.

The second great post-war change was the great development of medical psychology, the evolution of the modern theories of the neuroses, and the amazing increase in the recognition and effective practice of psychotherapy. The latter was quite unfitted for institutional work; so far as the psychoses were concerned it was a broken reed, as mental hospitals were not the right places for neurotic patients. The neurologist or neuro-pathologist pointed to his research laboratory "free from the taint of lunacy," and, on the other hand, the trouble with the psychologically minded psychotherapist was that he lacked clinical training in psychiatry, and so was forced to avoid the formality of diagnosis in every second or third case which he treated. This the speaker regarded as a sad and serious situation which ought to be faced. A large number of highly trained scientific men and women gloried in the fact that they had had little or no experience in a mental hospital, and they neglected no opportunity of belittling the work done in mental hospitals and the treatment to be gained in them. Why did not psychiatrists speak in their own defence? The polite and good-mannered depreciation of which he was complaining was much more deadly than any attacks by a poorly informed yellow press, and the profession as a whole should inform itself on the subject and stop the misrepresentation as far as possible. The Board of Control was the best friend that either the patient or the medical superintendent could have, yet the mass of the public seemed to fear and distrust that body. If more effect had been given to its views in the Mental Treatment Act, that Act would have been a better measure.

Dr. Yellowlees suggested that instead of keeping mild or recoverable or well-behaved cases out of mental hospitals, the confirmed and chronically insane should be removed into special institutions. By removing the supply of cheap unskilled labour the whole industrial and social aspect of the mental hospital would be altered, but this course would emphasise the strictly medical aspect of it, and it ought to satisfy those whose cry was for a curative clinic. His only other suggestion was a better education of both professional and public opinion. Something might be done towards this by the issue of a pamphlet which nailed to the counter some of the grossest of misrepresentations.

Dr. HAMILTON MARR (Scottish Board of Control) did not agree with Dr. Yellowlees' proposal to take from mental hospitals the chronic and apparently incurable cases; rather would he extend the sphere of mental hospitals to include care of cases before they became certifiable. He commended the example set by two or three mental hospitals in Paris, where members of the staff were required to have had four years' practice in mental institutions and to have passed two special examinations.

Dr. ISABEL WILSON suggested it might be possible to create assistantships in mental hospitals for six to twelve months for the benefit of those who had started analytical work.

Prof. D. K. HENDERSON said it was not his experience that the average junior medical officer assistant coming into a mental hospital minimised the importance of clinical psychiatry. Like Dr. Marr, he objected to the proposal to shift chronic patients from the mental hospital and place them into special institutions by themselves. These cases needed the same standard of care that other kinds of patients did.

Dr. ROLF STRÖM-OLSEN (Cardiff Mental Hospital), in association with Dr. MURIEL L. MCCOWAN, read a paper on

Prolonged Narcosis in Mental Disorder

Though the value of prolonged narcosis in mental disorder had been well recognised in Switzerland, Germany, Holland, and the United States, there had been as yet little tendency, he said, to use it in this country. A statement as to its dangers had deterred many psychiatrists from giving the method a trial. In the search for a perfect narcotic 40 substances had been tried. This paper set out results achieved in 107 mixed cases of mental disorder. In 117 of 128 separate treatments somnifaine was used, in 9 veronal, in 2 Dial. It was not yet possible to say in what forms benefit was most likely to accrue from this, as the rationale of the treatment was not properly understood. The therapeutic action seemed, however, to depend on two phenomena: first, the removal of inhibition or the discharging of libido from repressed complexes; and, secondly, the stage of narcotic sleep. This series of cases suggested that a degree of narcosis was required which would cause a deep sleep, as a "twilight sleep" was, in most cases, insufficient. In schizophrenia the best results were achieved in the excited or depressed phases. In this present series the most gratifying results were in 13 cases of psychoneurosis. Reassurance and suggestion were constantly used beneficially as additional means. He described in detail the technique followed, and tabulated the results, giving histories of a variety of cases.

Dr. K. C. L. PADDLE (Caterham Mental Hospital) said that the cerebro-spinal fluids of 2000 cases of mental deficiency of both sexes, and of all grades and ages, were examined. In 1500 of these cases, observations were made on the after-effects of lumbar puncture. 17 per cent. of these cases developed post-lumbar-puncture symptoms, 14·2 per cent. vomited, 6·8 per cent. had headache, and 0·73 per

MEDICAL SOCIETIES

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION

THE annual meeting of the Association took place at the Guildhall, Northampton, under the presidency of Dr. DANIEL F. RAMBAUT (St. Andrew's Hospital, Northampton), who gave an address on

Some Mental Treatments

In 40 years he had seen many changes in treatment of mental disease. Good nursing was essential. Originally the mental nurse was but a warder or keeper, whose purpose was to protect the public, not the patients. The great change from that was initiated by Pinel in Paris, and William Tuke in York Retreat, coupled with the great reforms of Lord Shaftesbury, embodied in the Lunacy Act of 1845 and the Lunacy Commission of 1859. The greatest credit for the change to the present efficient system must be attributed to the committee of the Medico-Psychological Association which, in 1890, resolved that it was advisable (1) to institute a system of training attendants in asylums, (2) to establish examinations in order to test the proficiency of candidates, (3) to grant certificates to those who succeeded at examinations. Commencing with 106 certificates, the number of candidates last year was 6920. Under the Association's scheme nurses could consider themselves established, could look forward to promotion, and to filling comfortable positions. One effect of the training was to show that roughness and tactlessness were due to ignorance, and nurses and attendants came to realise that they were treating illness. The quality of a nursing staff was largely dependent on the wages offered, but it depended partly also on the reputation of a particular hospital for making nurses comfortable and happy both at work and off duty. Nurses at St. Andrew's were encouraged to pursue their studies in general hospitals and to complete their general training there, and sisters having this dual training were appointed to senior posts, and invariably into the acute wards. He, like others, had found distinct benefit from having female nurses in male acute wards. Many cases of apparently unavoidable artificial feeding had on this account been fed naturally. He thought the example of Holland should be followed in giving young nurses a course in general education and knowledge, and this should be given by each mental hospital as part of the general course of instruction.

The President then sketched in detail the evolution of occupational therapy in mental treatment. Selection of the most suitable form of activity was of the greatest importance. The provision of reception hospitals he regarded as of great importance, as classification was essential for proper scientific investigation and treatment. Most mental hospitals were too large, their wards contained too many patients, and there was little possibility of therapeutic isolation or of differential grouping. The St. Andrew's Hospital Committee had now erected a reception hospital, Wantage House, whose entrance was separate from the main hospital, and it had its own gardens and recreation grounds. Its patients did not come into contact with the more chronic cases. Here, too, the distinctive features of patients who did not quickly recover could be carefully studied. The main aim of a reception hospital for acute psychoses must be the provision of adequate facilities for psychological and physical treatment. He stressed the value of hydrotherapy in the psychoses of toxic origin. Through the somatic treatment of mental disorders the speaker had seen a complete change introduced into the spirit of a mental hospital, as patients felt they were undergoing care for an illness, and were anxious to coöperate. This feeling had gradually permeated the whole hospital, with a corresponding improvement in the atmosphere.

Mrs. ELEANOR SLAGLE (Director of Occupational Therapy, New York State Department of Mental Hygiene) read a paper on

Occupational Therapy

She said that in the various institutions for mental or defective patients in New York State there were now 200 patients to each physician, but the proportion aimed at was 1 to every 150. Statistics showed that 45 out of every 1000 born in the State would, at some period of their lives, be affected with mental disorder, the expectancy being higher among women than among men. Last year 34,548 patients had occupational treatment, and great improvement was noticeable as a result. The aim was the social rehabilitation of the patients and habit training was specially attended to. Mrs. Slagle gave detailed schemes for various grades, and said that the medical staff prescribed the actual treatment programme of individual patients, and the nurse was shown the value of harmonious coöperation. Activities included the training of nurses and attendants.

Prof. W. M. von d. SCHEER (Grotingen, Holland) said that in the psychoses, which disorganised the higher functions of man, numerous therapeutic successes had been achieved, notably *malaria therapy* in dementia paralytica, salvarsan and tryparsamide therapy for cerebral syphilis, treatment of digestive apparatus in toxæmic psychoses, the removal of septic foci in cases of schizophrenic derangement, the Somnifaine sleep treatment of manic-depressive psychosis, and non-specific stimulation treatment in various other psychotic conditions. Yet the specialty was still to a large extent powerless in direct treatment. Great hope centred in occupational therapy. He declared that prolonged restlessness in wards need not occur, that baths were scarcely ever needed as a means of restraint, and that it was very seldom necessary to use isolation cells. Narcotics, too, could be reduced to a minimum. It was clear to him that the greater number of cases of unsocial behaviour had little to do with the specific psychoses as such; the behaviour departures were largely due to a disordered nervous system which was reacting wrongly to the stimuli of the external world. In Holland, work-therapy in mental hospitals had reached a high level. In his own institution no difficult work was expected of patients, and they worked in the immediate neighbourhood of the wards, so that disturbing elements could be at once removed. Promotion of patients to a higher class as a reward of effort always had a good effect, as did encouragement to take walks unattended. In the whole community order and self reliance were aimed at.

Dr. HENRY YELLOWLEES read a paper on

Modern Psychiatry and Mental Hospitals

He reminded members of the large share taken by the Association in organising the teaching of after the operation and lasting for the whole of the remaining life. This fact assigned great importance to the nature of the secretion of the anterior lobe of the pituitary. In hypophysectomised animals it was possible to restore activity without restoring sex activity. It was most probable that the actual physiological state of the individual to some extent determined its behaviour in any given situation. In the case of rats which were wild and brutal this attribute was lost a few days after removal of the anterior lobe of the pituitary, and it seemed that many of the factors responsible for highly dynamic motivation were associated with factors responsible for sex behaviour. Cushing's cases of adenoma of the pituitary had loss of the libido. In the female the conditions were more complicated, but there were a set of chemically definable factors which were responsible for sex expression. In the female there occurred the element of periodicity of sex manifestations and of reproductive drives in the proper sense. There were many activities in the care of the young, but they were to some extent motivated by chemical factors belonging to the hypophyseal and ovarian mechanisms. It was possible to evoke certain partial drives and maternal behaviour in virgin rats by appropriate endocrine treatment. Cannibalism was never observed in virgin rats. Dr. Wiesner's recent work had shown that environmental factors played an equally great rôle, though at present the relation between the physiological and environmental factors was not understood.

Dr. H. **Gardiner-Hill** said that a study of this subject must include hermaphroditism and sex reversal, the underlying pathology of which was little understood. As a physician his thoughts tended to the endocrine aspects of the problems. Presumably the chromosomal constitution was subsequently modified by other influences, endocrine and environmental. With regard to the former of these, it was now generally accepted that the hormonic stimulus which led to the growth of the secondary sex organs and characters came from the gonads themselves. Prepubic castration in the male resulted in underdevelopment of the sex organs, prostate, seminal vesicles, absence of beard, and the retention of the treble voice, while ovariotomy in the female led to corresponding differences. Cortical tumours were associated with varying degrees of virilism in the female, and it was thought that a hormone was produced which had exerted a masculinising influence. In cases of hermaphroditism one found generative cells peculiar to both sexes, and they possessed the so-called ova-testes, and these cases usually had feminine sex characters. Another group was that having the adreno-genital syndrome. The association of lesions of the adrenal cortex with virilism was well known. The pathological lesion might be a diffuse cortical hyperplasia or an actual neoplasm. In adrenal pseudohermaphroditism there were seen to be bodily developments towards the male type, associated with the internal sex organs of the female. Gross cases of these abnormalities were rare in comparison with people who had departures in minor degrees. The view must be accepted that the development of sex characters depended on a number of factors, but the pre-existing chromosomal constitution was very important.

Sir **Bernard Spilsbury** confined his remarks to the abnormality known as masochism, the rare cases of which led to medico-legal implications when the death of the individual occurred during the performance of the act. In this condition the individual subjected himself to severe physical restraint with the object of giving himself sexual gratification. His inquiries had led him to believe that the vice was accidentally acquired in early sexual life. A difficulty from the medico-legal point of view was that the rite was usually practised in secret, and the friends and relatives had no suspicion of it; therefore in a fatal case there was no clue to go upon except the surroundings at the scene of death. For this reason suicide was a very likely verdict in these cases, or even murder. He described in detail, aided by photographs, the case of a Cambridge undergraduate who was found dead in his chambers three years ago, whose death was for some time considered to have been due to a college "rag," but was found to have been a case of masochism. In this and two others which he described the death was an asphyxial one; whether the attempted asphyxia was the stimulus to the sexual act, or whether the asphyxia was the chief accidental cause of death in these cases it was difficult to say.

The **President** said that some cases of intersexuality he had encountered caused him grave perplexity, and he had hoped that Prof. Crew would have touched on practical difficulties. It was impossible until the eighth week of fœtal life to say whether the genital organs would be male or female—i.e., whether a Müllerian duct or a Wolffian duct would develop. Seeing that all must be, at some stage, bisexual it was difficult to say, when intersexuality arose, whether a person would be a man or a woman. He had always thought it important to consider the endocrine action, the suprarenal cortex, the pituitary, and the thyroid, as well as, to some extent, the pineal gland. C. J. Bond had reported the case of a cock pheasant which was a cock on one side, a hen on the other, and it was interesting to speculate how the chromosomes got to be so beautifully divided on opposite sides of the body. He, the speaker, had had four cases of pseudohermaphroditism referred to him in one month, and he operated on all four to decide as to the kind of gonad present. In each case he found a normal ovary. In these cases the secondary sex characters were of opposite kind to the anatomical structure of the gonad. Also, in pseudohermaphroditism one always found that the secondary sex characters of the female were much more perfect than were the sex characters of the male. In this condition, too, the ovaries were always more fully developed than were the testes. He contended that the law was wrong when it declared that an individual was a male or a female according to the nature of the gonad.

Dr. **Leonard F. Browne** remarked that masochism showed many forms of expression, but many, fortunately, did not lead the perpetrator into risks. There was also the opposite condition, sadism, in which the individual, instead of seeking to suffer pain, wished to inflict it on others. Recently a man was sentenced to 18 months' imprisonment for thrashing a girl in a garage. On appeal, that sentence was quashed. He asked whether, in the cases of masochism described by Sir Bernard Spilsbury, there was evidence of loss of semen.

Mr. **Lennox R. Broster**, speaking of the appearance of secondary male sex characters in the female, said these had been associated with changes in the adrenal cortex, but, so far, no one had demonstrated any change in that association. Operation had been done on 16 cases which were clinically classified by Dr. Gardiner-Hill as of this type, and in each the cells of the adrenal cortex were bright red, a condition not found in the adrenals of the normal person. A similar change was found in the anterior lobe of the pituitary, and in the interstitial cells of the testes. In seeking for an explanation, many fœtal adrenals were cent. pyrexia up to 101° F. The incidence of vomiting was nearly twice as high in females as in males, being 20·1 per cent. and 10·5 per cent. respectively. It was also higher in the feeble-minded group than in the imbecile or idiot group. There was a direct relationship between the rate of flow of the cerebro-spinal fluid and the incidence of post-lumbar-puncture symptoms. Where the former was rapid the incidence tended to be high, and where it was slow the incidence was relatively low. The tests used on the cerebro-spinal fluid were the Wassermann reaction, cell estimation, Pandy and Lange's colloidal gold; also the acetic anhydride of Boltz. Many pseudopositive Pandy and Boltz reactions were given by the fresh cerebro-spinal fluid. Of the 2000 cerebro-spinal fluids examined, 55, or 2·7 per cent., were abnormal. The Wassermann reaction was positive in 19 cases; excess of cells existed in 32, excess of globulin in 44, and the colloidal gold reaction was positive in 30. 23·9 per cent. of congenital syphilitics had abnormal cerebro-spinal fluids. The incidence of abnormal cerebro-spinal fluids was higher in cases of mental deficiency complicated by epilepsy or paralysis than in uncomplicated cases. The cerebro-spinal fluid of only 1 out of 54 Mongolian idiots gave a positive Lange's colloidal gold test. In the remaining 53 the cerebro-spinal fluid was normal in every respect.

During the meeting the Gaskell Prize and Gold Medal were presented to Dr. William Blyth, of Paisley District Mental Hospital, the divisional prize to Dr. E. J. Fitzgerald, and the bronze medal and prize to Dr. H. C. Beccle, of Springfield Mental Hospital, Tooting.

At the business meeting Dr. James Whitwell, who has done much for the library of the Association since 1927, and Mr. L. G. Brock, chairman of the Board of Control, were unanimously elected honorary members of the Association.

ROYAL SOCIETY OF MEDICINE AND MEDICO-LEGAL SOCIETY

A JOINT meeting of the section of obstetrics and gynæcology of the Royal Society of Medicine with the Medico-Legal Society took place at the headquarters of the former, and was very largely attended. The chair was taken by Prof. W. BLAIR-BELL, president of the section. The subject of discussion was

Sex : its Nature and Abnormalities

considered from Biological and Legal Points of View. Prof. F. A. E. CREW (Edinburgh), in opening, said it was customary, when seeking an understanding of the attributes of man in a complex society, to make a broad survey of similar phenomena in other forms of life. But human society presented a unique biological phenomenon, and it was doubtful whether there existed anything like it in the experimental material available to the biologist. Among animals there was no sin, but it must be assumed there was much crime, and it was to be doubted whether the student of human behaviour could hope to find explanations of things which puzzled him by turning to the rabbit and the bird. The biologist was no longer concerned with a search for an understanding of the nature of sex; he contented himself, in this stage of development, with a discussion of the analysis of the differences which permitted him to regard one individual with one kind of organisation and characterisation as a male, and another and contrasted kind of organisation as a female. In fact the more one knew of sexual differences, the less one felt one knew about sex itself. The mating of two dissimilar individuals, bearing the egg and the sperm, commonly resulted in the union of two dissimilar gametes, and it was easy to conclude that the meaning of sex could only be recognised by bringing it into essential relation with reproduction, the preservation of the species. Sexuality and reproduction, though commonly inter-related, could be completely dissociated. Many advantages had been gained as a result of our mode of evolution, but many more had been lost. In an ever-increasing number of species the existence of a sex chromosome had been demonstrated, and it was further established that in a considerable number of instances there was a dissimilarity in the matter of the sex chromosome constitution. The male was constitutionally heterogametic, the female constitutionally homogametic. Abnormalities in the distribution of the sex chromosomes were always associated with abnormalities in the sex characterisation of the individual. In one kind of fly it was possible to draw a line from its tip to its tail and demonstrate that all the characters on one side of its body were male, whereas all those on the other side were female. In that species of fly there could be a graded series of abnormal sexual types. In one fly there might be only one-sixteenth of the body male; according to the time at which it happened, there would be a larger or smaller area of male tissue in a creature which was otherwise preponderatingly female. Male-determining factors could differ amongst themselves in potency, and the female-determining factors could vary amongst themselves. Males could derive determinations from either father or mother, and as a result there could be an individual containing both male and female factors.

As a result, he asked subsequent speakers to try to *define what was male and what was female*, as, frankly, he did not himself know. In the case of binelia, a marine worm, at one stage the larvæ floating on the surface were all alike, and their sex was subsequently determined by accident. If they settled on the long proboscis of the female they became males, but if they settled well away from the female they became females. The biologist therefore, if appealed to on this matter, would probably confess that he had no knowledge as to the nature of sex.

Mr. B. P. WIESNER, Ph.D. (Edinburgh Biological Laboratory), spoke on mechanisms which regulate sex behaviour and associated activities. This analysis could be carried out on an entirely psychological basis. No such analysis had been attempted, and he did not think it would be as long as the historical attitude of the psycho-analyst ruled. In the past much confusion had resulted from the identification of motivation concerned with the offspring with that of sex drives. In humans complicated outside factors operated, but in the case of the rat, the male animal tried to mate with any other animal of its kind or of similar appearance, whether such animal be male or female; distinction of sexes in this matter was not a primary activator in animals. Selection of the female by the male was determined rather by the opposition on the part of the male to sex attentions by another male, and only the female would assume the necessary posture for reproduction. The testes could be removed after puberty without interference with the sex life of the animal, but complete removal of the anterior lobe of the pituitary resulted in the complete disappearance of all sex drive and the assumption of complete sex indifference, this changed attitude coming on 24 hours tissues can determine the diagnosis. They also point out the difficulty of avoiding radium necrosis of bone when treating certain lesions, particularly in the superior maxilla, and they accept Regaud's suggestion that this special susceptibility is due to the mineral salts in the bone producing secondary radiations. They consider that more careful dosage and increasing the time during which the radium is allowed to act should minimise these injuries.

The last two chapters deal with poisoning by radio-active substances and "X ray and radium quackery." In few words they paint an unforgettable picture of the terrible results which followed the ingestion of radium by girl workers in the famous New Jersey dial painters case, and also in several cases where radio-active water had been taken for therapeutic purposes. No doubt remains that poisoning by radio-active substances produces painful and fatal diseases, and readers will agree with the conclusion that legislation to schedule these substances as poisons is already overdue. An appendix gives us the recommendations of the X Ray and Radium Protection Committee, and a clear account of the methods of dosage at present in use.

There is an excellent bibliography, which completes a work of reference which should be studied not only by every radiologist, but by every practitioner who employs either radium or X ray in the treatment of his patients.

Management of Fractures, Dislocations, and Sprains

By John Albert Key, B.S., M.D., Clinical Professor of Orthopædic Surgery, Washington University; and H. Earle Conwell, Orthopædic Surgeon for the Tennessee Coal, Iron, and Railroad Company. London: Henry Kimpton. 1934. Pp. 1164. 63*s*.

This book on fractures deserves similar welcome from students, general practitioners, and surgeons. It is a complete account of modern ideas and methods, and in spite of bulk, contains no obvious redundancy; each injury is treated from every aspect, but nothing is included that has not practical value.

The introductory chapters give a short account of modern views on the repair of fractures, setting side by side the osteoblastic theory of bone-formation, in which the bone cell is considered the determining factor, and the theory which regards osteogenesis as a function of de-differentiated mesoblastic tissues occurring in the presence of an excess of calcium. In a short discussion of X rays in the treatment of fractures the authors express the view that it should be possible to diagnose and treat many fractures without radiography: protesting against the pressure put on doctors to obtain X rays of every case of suspected bone injury. There are descriptions of plaster-of-Paris technique, of extension methods, of open operation, and of the method of local anæsthesia for reduction of fractures. The chapter on compound fractures will be found a useful guide to the indications for débridement, primary suture, and inaction alone. This chapter is a good example of the method used throughout the book of teaching principles and encouraging thinking.

In the sections dealing with individual fractures the descriptions and illustrations are informing. Where two or more methods are considered by the authors to be of proved value details are given of each, and no method is mentioned that is not described. Little fault, we imagine, will be found with the selections of treatment, though some will regret that Robert Jones's flexion method in the treatment of fractures round the elbow should be condemned with what is, perhaps, rather a lack of understanding of his original description. The Sinclair glue extension is dismissed in words that suggest the details of its application have not been mastered. Special writers have dealt with fractures of the skull and of the face. The chapter on fractures of the skull and brain trauma, contributed by Dr. Charles E. Dowman shortly before his death, is an admirably clear exposition of a difficult subject. One correction seems to be called for. On p. 513, in a description of the method of reducing a supracondylar fracture of the humerus, it is rightly advised that the final manœuvres should take place with forearm in the pronated or partly pronated position, to obviate the danger of inward angulation of the lower fragment. A reference is given to a photograph on the next page which shows the manipulation being performed with the forearm held in very full *supination*. We do not agree with the suggestion here made that "perhaps the majority of men who treat fractures have relatively little interest in these lesions and expend as little labour and time on their fracture cases as possible." Anyhow, those who do regard such cases as uninteresting will find in this volume much to stimulate them to reconsider the attitude.

Formes chirurgicales de la tuberculose intestinale

By L. Bérard and M. Patel. Paris: Masson et Cie. Pp. 264. Fr.50.

There are but a limited number of general surgeons who can claim to have a considerable experience of intestinal tuberculosis. For others this monograph is invaluable, since it gives an account of the various tuberculous lesions met with in the intestine for which surgery is indicated. Not only is the pathology of the several conditions well described, but the means of diagnosis, the indications for surgical intervention, the correct choice of procedures, and the probable outcome are so clearly expounded, as very largely to compensate for small clinical experience. On these grounds the book can be warmly recommended. It is completed by a really good bibliography.

Aids to Neurology

By E. A. Blake Pritchard, M.D., M.R.C.P., Assistant Physician, Hospital for Epilepsy and Paralysis, Maida Vale. London: Baillière, Tindall and Cox. 1934. Pp. 376. 5s.

By the use of small yet clear type and thin yet opaque paper, the author of this latest addition to the Students' Aid Series has contrived to compress much knowledge into little space. The book slips into the pocket easily, and since it is intended for students "in the early years of their medical training" the facts are presented in as simple a manner as possible, without discussion of theories and with a minimum of anatomical detail. On the physiological side more is said, and this is to be recommended, for after all the study of symptoms is the study of functions. A general introduction on semeiology is followed by descriptions of syndromes and symptoms resulting from disease of the principal divisions of the nervous system—peripheral nerves, spinal cord, brain, and autonomic system respectively. In each of these sections the main morbid states likely to be seen by the student are examined seriatim, their causes specified, examined, and it was found that in all the males there was a marked eosinophil reaction between the 9th and 20th weeks; in the female this was present between the 10th and 15th week, but not so marked as in the male. The appearance of the eosinophil cell seemed to be associated with male characters. He thought it could be argued that there was a prolonged male phase in the female fœtus, and at an early stage that phase might be able to convert that fœtus into an undeveloped male at birth, and that might be the explanation of many of the forms of pseudo-hermaphroditism seen. Some of these abnormal cases could be classified into psychological types, and homosexual behaviour between women might be a manifestation.

Dr. MARGUERITE LOWENFELD said that in children the desire to tie themselves up, or to tie other children up, as described by Sir Bernard Spilsbury, was common, as was the desire to subject others to pressure on the windpipe. It seemed to be implanted in the minds of certain individuals, and did not necessarily have reference to the postpubertal period. She did not remember a case in a girl. Usually it occurred in association with other factors which showed that the individual was at any rate of neurotic constitution.

Prof. CREW, in reply, pointed out that in cell division nothing was commoner than for some chromosomes to get lost. Many abnormalities were due to an irregular and unusual distribution of chromosomes carrying genes which took the forms of disease. Most of the conclusions arrived at in respect of the human subject stood in need of re-examination. He had had sent to him quite 150 cases with an enlarged clitoris and otherwise a reproductive architecture which was largely female. But inside there were found testes, uterus, broad ligament, vasa deferentia, prostate, &c. He preferred to regard such a person as a male, especially as he believed there was no ovarian tissue there.

Sir BERNARD SPILSBURY said that he did not remember a fatality due to masochism occurring in a female. In reply to Dr. Browne, there was no evidence of ejaculation of semen in any of the cases he had quoted; but in the third case the individual evidently expected to have such an ejaculation as he was found wearing a condom. The others died before the expected conclusion had had time to materialise. He was interested to hear that this tying up practice occurred in the prepuberty stage in some; after puberty this kind of practice took on a sexual significance.

REVIEWS AND NOTICES OF BOOKS

X Ray and Radium Injuries

Prevention and Treatment. By HECTOR A. COLWELL, M.D., Ph.D., M.R.C.P., D.P.H., and SIDNEY RUSS, C.B.E., D.Sc., F.Inst.P. The Barnato Joel Laboratories, Middlesex Hospital. London: Humphrey Milford, Oxford University Press. 1934. Pp. 212. 14*s*.

THIS is a clearly written account of the various injuries which may result from therapeutic radiation carelessly administered or from the exposure to X rays or radio-active substances which cannot be entirely avoided by workers in this field. The book is arranged in a series of chapters, each of which deals with effects on one of the systems of the body, and this methodical attack on the subject gives a very complete picture. Experimental work of importance is briefly described with an eye to essentials, and the type of injury caused by excessive exposure, together with the reactions which may be expected in different tissues, are discussed. The skin is the subject of the first chapter, because it is so frequently, and sometimes so disastrously, injured, and also because the reactions observed in the skin have formed the basis for dosage in practically all X ray and radium therapy. Although the authors hope that X ray cancer in radiologists will become so rare as to have only historical interest, a most interesting description of the development of the neoplasm is given; they believe that once it is established treatment, to be successful, must be drastic. They advise a wide removal of the local growth, followed, if a histological diagnosis of cancer be made, by excision of the supratrochlear and axillary glands, with the lymphatic trunks between.

The section on the circulatory system is of particular interest for the clear account of the recent work by Yoffey and others on the function of the lymphocyte and its relation to the hæmopoietic organs. While admitting that this work is still controversial, the authors find it very suggestive, particularly when considered in the light of the tissue culture experiments of Maximow and his school, who showed that lymphoid tissue grown outside the body could give rise to typical myeloid elements. They believe that if the idea that the lymphocyte is a forerunner of the red blood corpuscle is accepted, it may prove to be the explanation of certain important radiation effects, and that a new and possibly fruitful field is open for investigation.

The effects of radiation on the generative organs are also described at length. These are of great scientific importance, because it was as a result of observations on the testes and ovaries that Regaud and his co-workers demonstrated the variations in radio-sensitivity which form the basis of his theory of selective action, and of a definite time factor. Their clinical importance is equally great. Radiation is now an accepted method of treatment for carcinoma of the uterine cervix, and for many cases of myoma of the uterus and menorrhagia, so that we must know what effect this radiation will have on the reproductive system of the woman, on the ova in the radiated ovary, and on the fœtus in cases of pregnancy. The authors conclude that radiation during pregnancy is unjustifiable, except in the presence of malignant growth, in which case the fœtus must be sacrificed. As regards the result of therapeutic radiation of the ovary they are more cautious; they agree with Murphy that it cannot be definitely stated that preconception radiation has a deleterious effect on the offspring, but consider that this verdict of "not proven" should not be made the excuse for indiscriminate radiation of the ovaries of young women for conditions which can be otherwise treated.

From the clinical point of view nothing is more important than the description of the reactions and sequelæ which may follow the therapeutic use of radium. This section of the book is of special interest in view of Dr. Coutard's warning in our last issue. The authors remind us that late complications may appear at any time from six months to three years after treatment, and that these late radium reactions may so simulate recurrence of the malignant disease that only careful histological examination of the

THE LANCET

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MODERN PHYSIOLOGY

IN the more stabilised sciences certain guiding principles have long been established, and the navigator on the ocean of research is able periodically to check his position with the sextant; in physiology he sails largely by "dead reckoning," and his course is only taken as correct when other explorers have charted the same seas by similar methods and confirmed it. Few have sailed so widely as Prof. BARCROFT, and his experience enables him in his newest work[1] to survey the details of such voyages as appear to him to indicate the existence of certain landmarks.

He takes first the dictum of CLAUDE BERNARD: "La fixité du milieu interne est la condition de la vie libre." Characteristically, the question is emphasised—how does the increasingly delicate control of higher animals over their internal environment help them towards a freer life? The principle of storage is then introduced; it rests on the thesis that an intermittent external supply cannot be translated into internal constancy unless depôts are laid down to be drawn upon when required. In spite of mechanisms calculated to keep constant the "milieu interne," and notwithstanding the existence of stores, there is a limit to which any single system can respond to a change in activity of the organism. For instance, although the tissues do not use all the available oxygen in the blood while at rest, during muscular activity the spare oxygen would be insufficient in itself to meet the situation; a greater number of capillaries must be opened, the output of the heart increased, the respiratory movements augmented, and so on. This introduces the principle of integration; in the author's own words: "Every adaptation is an integration." In contrast to this is the principle of antagonism; constancy of an entity such as muscle tone does not indicate inertia, but rather the balance of opposing forces such as excitation and inhibition; this makes for rapid and efficient adjustment. The latter may be achieved by "heightening the efforts of units already functioning or by marshalling a greater number of units," and so we have a discussion on "units" and the "all-or-none relation." A matter bound up with delicacy of response is the possible existence of a crude mechanism which has been overlaid, but not entirely supplanted, by a more refined one, and the principle of duplication of mechanism is suggested. Then how are we to measure the activity of a tissue? To take as a standard its resting activity is to adopt a notoriously unreliable criterion. Prof. BARCROFT suggests that its maximal capacity for effort is much more constant, and works out the principle of maximal activity. Briefly, we are asked to look at physiology from a new angle, and to regard it as a science based on certain characteristic principles.

The critical reader will realise that all these ideas are not new, and that others may turn out to be fallacious; he may even think that some have been omitted. The last thing one would suppose from the tone of the work, however, is that the author claims finality. It is an adventure, and the approach he has opened up will doubtless be exploited by others until by elimination a few fundamental principles are accepted. It is, moreover, a personal adventure. Running right through is the thread of the author's own experience; no attempt is made at exhaustive treatment of any subject in the modern review sense of considering every piece of work which has been done. The core of each chapter is an idea, and an arbitrary selection of evidence is made just sufficient to render this clear; it is not surprising, therefore, that the work of the Cambridge school bulks large in the arguments advanced. These are closely reasoned, often ingenious, and call upon the powers of concentration of the reader; as is to be expected, they may nearly all be applied to investigations not mentioned by the author and which must be supplied by the reader himself if he is to obtain full value from the exposition. The treatment is never heavy, and is relieved by frequent outcrops of humour and reminiscence. Intense individuality is the keynote of the style, and in places accounts for the material itself; if Prof. BARCROFT feels like writing a great deal about a single point he does so. Ten times the amount of space allotted to the kidneys is devoted to the lungs in considering the regulation of H-ion concentration, but a fascinating theory of respiration is evolved. It would not be difficult to pick out points for criticism—as for example, the treatment of Head's theory of sensation—but the whole value of the work, apart from the account of certain original investigations, is in its stimulus to thought, and criticism not directed at the main thesis is hardly valid. Although it is probably true to say that no one could read this work without acquiring new information, it should be studied by everyone interested in the evolution of physiology not for this reason, but for the sake of its orientation.

MAGNESIUM SALTS IN NEPHRITIS

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[1] Features in the Architecture of Physiological Function. By Joseph Barcroft, C.B.E., M.A., F.R.S., Fellow of King's College, Cambridge; Hon. M.D., Louvain; D.Sc., Queen's and National Universities of Ireland. London: Cambridge University Press. 1934. Pp. 368. 20s.

[1] Bull. Johns Hopkins Hosp., 1926, xxxix., 69; Jour. Amer. Med. Assoc., 1931, xcvii., 1052.

Outline of the Cranial Nerves

By John Favill, M.D., Associate Clinical Professor of Neurology, Rush Medical College. London: Cambridge University Press. Pp. 112. 8*s*. 6*d*.

It is not easy to write a compendium of cranial nerve anatomy and physiology in small compass. The subject is intricate; tests are sometimes elaborate and cannot be made less so; some matters are still sub judice; while in regard to others conflicting views obtain. Dr. Favill's little book is so good that it is worth while pointing out one or two things that should be reconsidered in a future edition. Under the list of conditions associated at times with optic atrophy reference should also be given to oxycephaly, Friedreich's disease, amaurotic family idiocy. It is surely a mistake to put down Mongolian idiocy as a cause of optic neuritis, or Friedreich's disease as a cause of retrobulbar neuritis. The worth of Wernicke's reaction (pupillary) has been challenged more than once successfully. Under the pathology of the oculomotor nerve mention of recurrent types and their causation might be made. Ingvar's explanation of the Argyll Robertson pupil is not, we consider, the "best," since it does not explain its occurrence in tumours of the anterior colliculi. Anisocoria may also occur in lesions of the temporal lobe and this deserves note. The difference between the respective actions of atropine and cocaine on the pupil is not made altogether clear. Myasthenia should be added to the list of causes of transient diplopia. The "jelly" nystagmus of disseminated sclerosis is worth specifying. Syringomyelia is also a cause of nystagmus. Deep sensibility from ocular muscles is not conveyed by the fifth.

Despite these and other minor matters we congratulate the author on his admirable little volume, which serves a most useful and practical purpose.

Recent Advances in Pathology

Second edition. By Geoffrey Hadfield, M.D., F.R.C.P. Lond., Professor of Pathology in the University of Bristol; and Lawrence P. Garrod, M.A., M.D., B.Ch. Camb., M.R.C.P. Lond., Bacteriologist and Lecturer in Bacteriology, St. Bartholomew's Hospital. London: J. and A. Churchill. 1934. Pp. 457. 15*s*.

In the second edition of this excellent book the text has been revised and a few additions have been made. These, while not adding greatly to the bulk of the book, considerably enhance its value. In particular attention may be drawn to a section on the pituitary gland which shows clearly the general trend of recent work on this subject. The section on the digestive system includes a discussion of the different forms of anæmia; this is justified by the accumulation of evidence that certain forms of anæmia are fundamentally disorders of gastro-intestinal function. Recent observations incriminating radium as a carcinogenic agent are described in the chapter on experimental cancer research. The section on vitamins has been rewritten and brought up to date. In the neurological section a few errors are perpetuated, for example the statement that capillary hæmangioblastomas are confined to the cerebellum, and the treatment of the very difficult subject of the gliomas leaves something to be desired. In such a matter it is obvious that all exponents cannot be satisfied, but the authors have hardly recognised the large measure of agreement that exists on such aspects as are essential for teaching purposes.

The work as a whole is well up to date and provides a most useful adjunct to the ordinary text-book on pathology.

La sténose hypertrophique du pylore chez le nourisson

By J. Poucel, Surgeon to the Hospitals of Marseilles. Paris: Masson et Cie. 1934. Pp. 108. Fr.20.

This well-planned monograph on hypertrophic stenosis is a valuable contribution to the surgery of infancy. The section on ætiology and pathology of a little understood condition is well set out. Dr. Poucel, while not stressing any particular theory, inclines towards that of a sympathetic nervous system anomaly. The clinical aspect is fully described, with a vivid and accurate description of the appearances of acute starvation so often seen in pyloric stenosis. In discussing the investigation of a suspected case the importance of the blood chemistry is perhaps unduly stressed, and similarly one would hesitate to assert that every case should undergo X ray examination. In discussing the differential diagnosis between pylorospasm and true stenosis the author notes that the former condition will yield in the majority of cases to treatment by calcium chloride, belladonna, lavage, and ultra-violet ray treatment, and he wisely asserts that cases of so-called spontaneous cure are usually cases of spasm—a belief supported by those of wide experience. In the section on treatment, the importance of collaboration between physician and surgeon is well emphasised, and all will agree with the author's insistence on breast feeding where possible throughout the treatment, whether medical or surgical. It is also satisfactory to find that early operation, as soon as diagnosis is established, is strongly advocated, since only in this way can a low mortality be achieved. In the section on operative technique Dr. Poucel points out that the operation, usually associated with the name of Rammstedt, was actually first described and practised by Fredet. Nowadays, when local anæsthesia is extensively used for this operation, it seems strange to see chloroform advocated as the anæsthetic of choice, especially as the subject is not uncommonly in a toxic condition, due to starvation and gastric fermentation.

The monograph is carefully and accurately written and should certainly be studied by both the pædiatrician and the surgeon interested in children's disorders.

THE LANCET

LONDON: SATURDAY, JULY 14, 1934

MODERN PHYSIOLOGY

In the more stabilised sciences certain guiding principles have long been established, and the navigator on the ocean of research is able periodically to check his position with the sextant; in physiology he sails largely by "dead reckoning," and his course is only taken as correct when other explorers have charted the same seas by similar methods and confirmed it. Few have sailed so widely as Prof. BARCROFT, and his experience enables him in his newest work[1] to survey the details of such voyages as appear to him to indicate the existence of certain landmarks.

He takes first the dictum of CLAUDE BERNARD: "La fixité du milieu interne est la condition de la vie libre." Characteristically, the question is emphasised—how does the increasingly delicate control of higher animals over their internal environment help them towards a freer life? The principle of storage is then introduced; it rests on the thesis that an intermittent external supply cannot be translated into internal constancy unless depôts are laid down to be drawn upon when required. In spite of mechanisms calculated to keep constant the "milieu interne," and notwithstanding the existence of stores, there is a limit to which any single system can respond to a change in activity of the organism. For instance, although the tissues do not use all the available oxygen in the blood while at rest, during muscular activity the spare oxygen would be insufficient in itself to meet the situation; a greater number of capillaries must be opened, the output of the heart increased, the respiratory movements augmented, and so on. This introduces the principle of integration; in the author's own words: "Every adaptation is an integration." In contrast to this is the principle of antagonism; constancy of an entity such as muscle tone does not indicate inertia, but rather the balance of opposing forces such as excitation and inhibition; this makes for rapid and efficient adjustment. The latter may be achieved by "heightening the efforts of units already functioning or by marshalling a greater number of units," and so we have a discussion on "units" and the "all-or-none relation." A matter bound up with delicacy of response is the possible existence of a crude mechanism which has been overlaid, but not entirely supplanted, by a more refined one, and the principle of duplication of mechanism is suggested. Then how are we to measure the activity of a tissue? To take as a standard its resting activity is to adopt a notoriously unreliable criterion. Prof. BARCROFT suggests that its maximal capacity for effort is much more constant, and works out the principle of maximal activity. Briefly, we are asked to look at physiology from a new angle, and to regard it as a science based on certain characteristic principles.

The critical reader will realise that all these ideas are not new, and that others may turn out to be fallacious; he may even think that some have been omitted. The last thing one would suppose from the tone of the work, however, is that the author claims finality. It is an adventure, and the approach he has opened up will doubtless be exploited by others until by elimination a few fundamental principles are accepted. It is, moreover, a personal adventure. Running right through is the thread of the author's own experience; no attempt is made at exhaustive treatment of any subject in the modern review sense of considering every piece of work which has been done. The core of each chapter is an idea, and an arbitrary selection of evidence is made just sufficient to render this clear; it is not surprising, therefore, that the work of the Cambridge school bulks large in the arguments advanced. These are closely reasoned, often ingenious, and call upon the powers of concentration of the reader; as is to be expected, they may nearly all be applied to investigations not mentioned by the author and which must be supplied by the reader himself if he is to obtain full value from the exposition. The treatment is never heavy, and is relieved by frequent outcrops of humour and reminiscence. Intense individuality is the keynote of the style, and in places accounts for the material itself; if Prof. BARCROFT feels like writing a great deal about a single point he does so. Ten times the amount of space allotted to the kidneys is devoted to the lungs in considering the regulation of H-ion concentration, but a fascinating theory of respiration is evolved. It would not be difficult to pick out points for criticism—as for example, the treatment of Head's theory of sensation—but the whole value of the work, apart from the account of certain original investigations, is in its stimulus to thought, and criticism not directed at the main thesis is hardly valid. Although it is probably true to say that no one could read this work without acquiring new information, it should be studied by everyone interested in the evolution of physiology not for this reason, but for the sake of its orientation.

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50 per cent. solution was given by the mouth or per rectum and repeated every four hours; later it was observed that a more rapid effect could be produced by the intravenous injection of a 1 per cent. solution of the anhydrous salts in doses of 10 c.cm. per kg. of body-weight or by the intramuscular injection of a 25 per cent. solution of the salt in doses of 0·2 to 0·4 c.cm. per kg. In a recent paper, however, A. D. HIRSCHFELDER [2] points out that the use of magnesium sulphate in nephritis is not without danger, especially if it is given by the mouth when the increase in the magnesium content of the plasma cannot be controlled. In a normal organism the administration of magnesium sulphate is followed by rapid excretion of the ingested salt through the kidneys and the plasma magnesium shows only a slight rise, the maximum increase being 0·4 mg. per 100 c.cm. of plasma. But in conditions of impaired renal efficiency, whether induced experimentally in animals or present in man, the excretion of magnesium salts is greatly delayed, and the administration of Epsom salts per os therefore leads to a tremendous and rapid rise in the plasma magnesium. In animals with experimentally induced renal insufficiency this may be sufficient to raise the level from the normal of 2 mg. per 100 c.cm. of plasma to the neighbourhood of 17 mg., when coma sets in. In nephritic patients an ordinary purgative dose of Epsom salts may raise the magnesium content to 10 mg. or even higher, and a number of patients showed a decidedly increased drowsiness or even a light coma accompanying the increase in plasma magnesium. It is pointed out that a condition easily mistaken for uræmic coma can be induced sometimes in nephritic patients by Epsom salts purgation.

When the magnesium content of the plasma was determined in patients with acute, subacute, and chronic glomerulonephritis before and after the administration of Epsom salts, it was found that there were two distinct groups: those with an abnormally high and those with an abnormally low magnesium content. The majority of the patients (nine cases) showed a slightly higher level—3 to 5 mg. of magnesium in 100 c.cm. of plasma—but in three the increase in the magnesium content was considerable (from 9 to 13 mg.). In such cases therefore the use of sodium sulphate as a purgative is preferable to Epsom salts. In a smaller group of four patients the magnesium content of the plasma was reduced to half the normal level, and there were general muscular twitchings. These were abolished by a purgative dose of Epsom salts which also raised the magnesium level considerably, but not to the same high figures as in the patients with a high plasma magnesium. A low plasma magnesium associated with general muscular twitchings was observed also in six patients suffering from other conditions such as parathyroid deficiency, eclampsia, and epilepsy. In these patients also the muscular twitchings were abolished by a purgative dose of Epsom salts. It will be seen therefore that there is a clinical syndrome of high plasma magnesium accompanied by drowsiness or coma and another one of low plasma magnesium accompanied by muscular twitchings or convulsions.

The observation that nephritis in man may be associated with an abnormally high or an abnormally low magnesium content of the plasma gains additional interest from the fact discovered by W. CRAMER [3] that it is possible to produce experimentally an extensive glomerulonephritis by a diet deficient in magnesium salts. This effect is due to an imbalance between calcium and magnesium ions, known to be biological antagonists, since the nephritis fails to appear if both magnesium and calcium salts are omitted from the diet. This suggests that the Ca : Mg. ratio in the plasma is of more importance for the maintenance of renal efficiency than the absolute amounts of either magnesium alone or calcium alone and that investigations along these lines may throw fresh light on the problem of nephritis.

THE LONDON CHILD

To ratepayers who have watched a little wryly the progressive policy of the London County Council with regard to public health, Sir FREDERICK MENZIES's latest report [4] as school medical officer should prove particularly reassuring. The direction of the energies of the school medical service toward the prevention and control not only of disease but of the factors tending to defective physical development should do much to reconcile those whose money is spent "by somebody else for somebody else."

The eldest groups of children with whom the report is concerned are a product of the post-war years, the "leaving" class having been born in 1919 and 1920, at a time when large numbers of able-bodied men had been demobilised and the birth-rate was rising rapidly. Their superior physique as compared with the children born a little earlier is perhaps attributable not only to better nurture but also to the fact that a considerable proportion of wartime babies belonged to fathers physically unfit for military service. While it is hard to say whether there is actually an increase in stature in the present as compared with earlier generations, a comparison of the average figures for height and weight, obtained by Dr. R. H. SIMPSON in his survey of the 10-year-old group of boys and girls in 1933, seems to show a significant gain over corresponding figures for the whole of London between 1902 and 1907. Similarly a comparison of the average height of recent secondary school boys between the ages of 14 and 15½ with Roberts's tables (compiled about 50 years ago from artisans, public school boys, and cadets) show an increase of about 1 inch at each age. In the Council's residential schools and homes a new standard (provisional) dietary came into force in March, 1932, and Dr. W. P. SHELDON has compared the weights and heights of children at the time the new dietary was introduced with the weights and heights of children of the same age who have had it for a year. In 10 out of 13 age-groups the advantage in both weight and height lies with the children on the new dietary, and it is found that the actual average increases in each age-group considerably exceed the expected increase as calculated from the average weights of London elementary school-children of different ages. The improved dietary is given in detail in the report. In the ordinary school the continued high incidence of unemployment and economic depression has made the provision of "meals" (dinners with 25 g. of protein and 750 calories, milk, and cod-liver oil and malt) increasingly necessary. The school care committee is required to "place upon the feeding list every necessitous case requiring additional nourishment in order to profit by the education provided," and 4½ million meals, of which nearly 2 million were paid for out of the rates, were provided in 1932–33. One is inevitably reminded of the savage description of the modern world—

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[2] Jour. Amer. Med. Assoc., 1934, cii., 1138.

[3] THE LANCET, 1932, ii., 174; Proc. Roy. Soc. Med. (discussion on nephritis), 1934, xxvii., 801.

[4] London County Council, Annual Report of the Council, 1933, vol. iii. (Part II.), Report of the School Medical Officer for the Year 1933. By Sir Frederick Menzies, K.B.E., F.R.C.P., County Medical Officer of Health and School Medical Officer. Copies obtainable from P. S. King and Son, Ltd., 14, Great Smith-street, London, S.W.1. 6d.

> "Science finds out ingenious ways to kill
> Strong men, and keep alive the weak and ill
> That these a sickly progeny may breed
> Too poor to tax, too numerous to feed"

and can only hope that the future will justify the attempts now being made to keep the standard of living for all children at a level that makes healthy growth and development possible.

The rôle of the physically defective schools could usefully be studied by most medical men who are unfamiliar with their organisation. Dr. GERALD SLOT has carried out an inquiry into the causes of absence from these schools, and finds that children are often excluded by medical certificate because of the very diseases that the schools are designed to treat. Usually more rest and warmth can be had at these schools than at home, and not infrequently the medical certificate simply provides facilities for playing in the street or helping with the housework. Additional reasons for non-attendance include missing the ambulance (which may not be able to enter the alley in which the child lives, and must be awaited at "points" in the street), subconscious malingering, and over-anxiety on the part of parents; whilst genuine illness, requiring hospital or convalescent treatment, is of course commoner than in normal children. The work nowadays called child guidance is not directly undertaken by the Council as an education authority, but a clinic is available through the mental hospitals service at the Maudesley Hospital where psychotherapy is available for school-children and others. Here, and at other centres, including the London Child Guidance Clinic and the East London Clinic, the attendances are allowed to be counted as attendances at school. Except at the Maudsley, however, the provision of child guidance is by voluntary hospitals and associations. Open-air education is provided for tuberculous cases in six open-air day schools, accommodating a total of 568 children, and there are nine such schools for non-tuberculous children (1627). In addition there are seven convalescent camp schools and 209 open-air classes in playgrounds and parks. Despite the difficulties of the London climate, there is no question that these schools are filling a real need and are extremely successful with selected cases, especially those of chronic lung infection.

The report as a whole gives evidence of activity and expansion in almost all the fields covered, and it is impossible not to be impressed with the spirit of optimism in which it is conceived and written.

ANNOTATIONS

BRITISH EMPIRE CANCER CAMPAIGN

THE eleventh annual report of the British Empire Cancer Campaign, a substantial volume of 220 pages, contains reports from 30 institutions or individual workers who have been subsidised by the Campaign. At the annual general meeting held at the House of Lords on July 9th, Lord Reading presiding, Mr. Cecil Rowntree said that the report afforded convincing proof that the purposes for which the Campaign was founded were being fulfilled. The work carried out in the different centres differs necessarily both in its extent and in its value, and it is only intended to indicate here some of the more important advances made. A group of research workers at the Cancer Hospital, under the direction of Prof. E. L. Kennaway, some years ago isolated from tar substances having the power to induce cancer. They then proceeded to prepare synthetically a large number of chemically pure organic substances and to test their carcinogenic power. This work, to which we have repeatedly drawn attention, led to the surprising discovery that some of these carcinogenic substances were chemically closely allied to substances normally present in the cells, such as the sterols and the chemically related bile acids, which are probably formed from sterols This suggested the possibility that the cells of the body, when placed under abnormal conditions, might be able to form, as abnormal metabolites, substances which are carcinogenic. In order to test this question Mr. J. W. Cook, M.Sc., and Mr. G. A. D. Haslewood have taken as their starting point one of the bile acids and have prepared from it an actively carcinogenic substance. This transformation was effected by a series of chemical changes of exactly the same nature as those which commonly occur in the body. The chain of evidence is therefore nearing completion that carcinogenic substances can be formed by the cells in vivo. The hormone œstrin, one of the substances normally present in the body, is also chemically closely allied to the sterols and to some of the synthetic organic substances capable of inducing cancer. Investigations carried out in conjunction with Prof. E. C. Dodds have shown that some of these synthetic carcinogenic substances have also the power to induce œstrus, although in comparison with œstrin larger amounts are required. But not all carcinogenic substances can produce œstrus, and œstrin itself is not carcinogenic.

Another interesting line of investigation was initiated a few years ago by Dr. P. R. Peacock at Glasgow. He showed that it was possible to induce with comparative ease sarcomata in fowls by the injection of tar or of pure organic carcinogenic substances. Some of these tumours could be propagated, but only by the transplantation of living cells, and not by the inoculation of a cell-free tumour extract. This seemed to establish a difference of ætiological importance between the malignant growths which arise in fowls and mammals including man in response to chemical substances on the one hand, and on the other the group of filtrable tumours discovered by Rous which can be propagated by an "extrinsic agent" or "virus." Prof. E. Mellanby appears to have had a similar experience but the experimental details of his work have not yet been published. Prof. J. McIntosh now states that he has succeeded in producing in fowls by tar a number of sarcomata, three of which proved to be filtrable, and a similar result is reported by Dr. A. Haddow from Edinburgh. These results are a strong argument in support of the view that the filtrable fowl tumours represent true malignant neoplasms, and that they should not be set aside as an atypical form of malignancy with an entirely different ætiology. In the introductory summary to the report the conclusion is drawn from these findings that the behaviour of the filtrable fowl tumours is due to some characteristic property peculiar to fowl cells; that, however, is not the only possible explanation.

In Leeds Prof. R. B. Passey has begun a reinvestigation of the classical experiments of Fibiger on spiroptera cancer, in which the experimental production of cancer was demonstrated for the first time. Prof. Passey's work indicates that other subsidiary factors, not suspected at the time by Fibiger, play a part in the process. Dr. R. E. Havard and Dr. Sylvia Dickenson have tested the truth of the statement frequently made that the blood of patients suffering from cancer is abnormally alkaline. Using arterial blood and an exact physical method they failed to find any change. Dr. J. W. Orr has carried out experiments showing that fibrosis of the dermis facilitates [illegible] resumably because it interferes [illegible] y. The action of radium and X rays has been investigated in a number of centres, both from the experimental and from the clinical side, notably at St. Bartholomew's Hospital, the Westminster Hospital, the Mount Vernon Hospital, the Strangeways Research Laboratory, and the Christie Hospital and Holt Radium Institute in Manchester. It is noteworthy that the question of changes in the leucocyte count following irradiation, on which we commented last year, has been reinvestigated in the Manchester centre, and as a result two points are emphasised: (1) there is a lymphopenia in patients treated by radium which increases with the dose; (2) blood counts repeated at least once a month have been found of definite value in keeping a check on the health of the staff engaged in radiotherapeutic work.

The eleventh report of the Campaign is commendably free from exaggeration of the value of the results obtained, nor do these need exaggeration. The report represents a real advance both in our understanding of the ætiology and in our efforts towards the treatment of the disease, and is the best possible argument for the continued support of the work by the general public for whose benefit it is done.

RADICAL SURGERY OF THE MAXILLARY ANTRUM

IN the surgical treatment of suppuration of the maxillary antrum rhinologists in this country of recent years have favoured the intranasal operation, by which an aperture is made in the antronasal wall large enough to remain open permanently and the drainage thus established is relied on to effect a cure. The Caldwell-Luc operation, which exposes the antral cavity through its anterior wall as a preliminary before making the opening into the naris, is usually reserved for the more intractable cases and for those in which a portion of tooth or of dead bone is lying in the antrum, or in which there is definite polyposis. Dr. Edward F. Ziegelman,[1] of San Francisco is now advocating the latter method, together with removal of the entire mucous membrane lining the cavity and of the anterior ethmoidal cells, also in all those cases where there is disease in the neighbourhood of the natural ostium. He strongly objects, however, to the usual transverse incision with elevation of the premaxillary soft structures from the bone, and makes an inverted T-shaped incision of which the vertical branch runs obliquely upwards and outwards parallel to the fibres of the facial muscles. Since these muscles run in the upper lip, and the incision is placed deeply to this, it is difficult to see how it can be a matter of any great importance. The most noteworthy part of his communication is concerned with anæsthesia for the operation. He prefers a local anæsthetic and considers that nerve-blocking is the ideal method. This he produces by injection through the external aspect of the face, passing a long needle into the neighbourhood of Meckel's ganglion in the spheno-maxillary fossa. The needle is inserted at a point on the inferior margin of the zygoma two-fingers' breadth external to the outer bony angle of the orbit, and directed towards the external angle of the opposite orbit to a depth of approximately 7 cm.; 3 c.cm. of 1 per cent. novocain are injected. As the injection does not always catch the main trunk in its entirety, a second injection of 2 c.cm. is made into the infra-orbital nerve at its exit from the foramen. Since the anterior ethmoidal cells often have to be opened during the operation, these are anæsthetised by a pack of 5 per cent. cocaine beneath the middle and inferior turbinals, or by injection of 1 c.cm. of the novocain solution into the region of the anterior ethmoid foramen through the skin at the inner angle of the orbit. Dr. Ziegelman mentions that the patient often objects to the insertion of the needle into the spheno-maxillary fossa by way of the external surface; such objections, which are hardly surprising, may be met by injection via the posterior palatine canal by means of a curved needle inserted through the mouth. In addition to the novocain injections, the patient is given, two hours before operation, grs. 10 of one of the barbiturate salts by the mouth, and an hour later a hypodermic injection of morphine sulphate gr. ¼ with scopolamine gr. 1/200. Probably surgeons in this country will prefer a general anæsthetic in cases where it is not definitely contraindicated.

PUBLIC HEALTH IN THE IRISH FREE STATE

AN extensive account of the activities of the Departments of Local Government and Public Health in the Irish Free State is given in the 1932–33 report of the Minister.[2] Sanitary surveys, it is reported, were carried out by the medical inspectors of the department in 37 different areas (the majority urban), and where serious defects in the sanitary administration were discovered they were brought to the notice of the local authority, special attention being paid to water-supplies and sewerage systems. Despite the constant intercourse with England and Wales the last appearance of small-pox in the country was, it is oted, as long ago as November, 1923, and no fatal ase of the disease has been registered since 1907. On he other hand, 30 cases of typhus, with 8 deaths, ere recorded in 1932, whereas in England and Wales here were only 9 deaths from this cause in the whole f the ten years 1923–1932. Twenty-five of the 30 ases occurred in Kerry County and 22 from three amilies affected in an outbreak in November. A eneral campaign of delousing and disinfection was instituted and no further extension took place. Notifications and mortality from diphtheria both showed in 1932 an appreciable rise over the figures of the previous year, and immunisation schemes have been organised in numerous areas. In Cork County Borough, where a prolonged epidemic has been experienced, nearly 7000 children were immunised between 1929 and 1932, and the high record of 626 cases in 1930 fell to 282 cases in 1931, and to 90 cases in 1932. The case-mortality rate, however, has not kept pace with the reduction in notifications and was as high as 19 per cent. in 1932, though, it is important to note, no immunised child died. With the decline in the incidence of the disease in Cork there was observed a marked falling off in the number of children brought to the immunisation clinic, so that the consequent increase in the number of non-immunised children may provide a new field for the extension of the disease.

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[1] Western Journal of Surg., Obstet., and Gynæcol., February, 1934.

[2] P. No. 1151. 1934. 2s. 6d. net.

An unsatisfactory feature of the registration returns for 1932 was a slight rise in the infant mortality-rate to 72 per 1000 births, chiefly attributable to an increased mortality from diarrhœa and enteritis and pneumonia. Nursing associations to attend to the health of the infant and young children, as well as of expectant and nursing mothers, are being organised, and with the help of the sweepstake surplus a number of such associations were launched during the year. Rapid development has also been made in the school medical inspection arrangements which in 1929 covered only 146,000 children and in 1932 extended to 378,000, or 75 per cent. of the elementary school population. Many of the medical officers comment upon the incidence of malnutrition, and in June, 1932, the Dáil voted £100,000 to assist local authorities to provide free milk and so ensure that during the period of economic distress children in the poorest families should not suffer from a lack of food essential to their healthy growth and nourishment. In spite of the economic position a new low record was registered for tuberculosis mortality, though the crude death-rate of 1·24 per 1000 is considerably higher than that in England and Wales. Other sections of the report are devoted to local finance and administration, to housing, public assistance, and to roads.

SILICOSIS IN THE SOUTH WALES MINER

Few diseases require a more comprehensive survey before diagnosis than silicosis. In the June issue of the *Practitioner* Dr. A. J. Amor and Dr. R. G. Prosser Evans made a brief assessment of the various factors of this disease as it affects the South Wales coal-miner. Although they admit that W. R. Jones's recent suggestion of sericite as a causative factor needs careful consideration, they do not appear to regard the evidence as it stands at present as convincing. In dealing with the all-important matter of X ray examination, the authors stress the necessity for accurate standardisation of films, especially the exact centring of the patient, a speed of exposure which will avoid blurring, and standard developing. A pre-X ray stage of the disease is recognised in addition to the first, second, and third stages of the shadowing on the film. Details are also given of a method of chemical examination which they adopt in investigating the silicotic lung after removal from the cadaver. The lung is first X rayed with a soft tube and areas which appear to be suspicious in the film are selected for pathological examination, together with immediately adjacent areas. The portions thus removed are divided into two so that as far as possible macroscopically identical portions can be used both for section work and for estimation of silica content. Whilst recognising that this method is open to some criticism, the authors believe that it enables a fairly full and accurate description of the pathological condition to be made. Chemical determinations of silica content are considered to be of value and importance when assessed together with the other diagnostic factors; but taken alone they are, in the opinion of the authors, of little use because a high silica content may be found in lung tissue in which no gross lesion is present. Two methods of silica determination are used: (1) the modification of the colorimetric method of Isaac; and (2) the gravimetric method of Treadwell and Hall. A representative series of determinations of silica content from six areas of a lung are given in a table, showing a range from 16·32 to 28·15 per cent. in two upper lobe portions.

ORGANISATION IN THE OPERATING THEATRE

Dr. Eugene H. Pool, of New York, a surgical teacher of great experience, writing of the part played by the nurse in the organisation of the operating theatre, says "her coöperation, skill and goodwill are usually taken for granted." It is substantially true that where the work of the nursing staff is efficient its importance to the success of the operation is unrealised, or at least forgotten, by the surgeon—until her coöperation breaks down in some detail. If this detail is of sufficient importance—as, for instance, a miscount of the swabs in an abdominal operation, or a muddle over the contents of the bottles on the anæsthetic table—the surgeon is made sharply aware of the degree of responsibility he is delegating to the nursing staff. Such an incident may stimulate his interest in the manner and material of the instruction given to the theatre nurse; but, for the most part, the responsibility for such instruction is left entirely in the hands of the theatre sister, who is not necessarily appointed to her post on a definite knowledge of her powers of training those working under her. Dr. Pool's remark, which we have quoted above, occurs in a foreword to the revised edition of a book[1] by Prof. Henry C. Falk, F.A.C.S. The basis of the book is a course of lectures given to the theatre nurses of the French Hospital of New York City. The book has been brought up to date and made as comprehensive as possible. Any doctor unfamilar with the amount of detail and specialised knowledge involved in the efficient conduct of a theatre behind the scenes would do well to look through this book, which contains many suggestions for increased efficiency.

In organising the work of an operating theatre, the first essential is a clear understanding about the delegation of responsibility. On the surgeon rests the responsibility for the patient's life. It is for this reason that, during the conduct of the operation, he must receive active and willing coöperation from everyone assisting him. All his orders and requests—reasonable or unreasonable as they may appear to others—must be obeyed at once. This is a point of view which is obvious when stated, but is not always implicit in the attitude of the nursing staff, probably because the reason behind it is imperfectly realised. The surgeon, in his turn, delegates responsibility to the theatre sister, and it is really essential that he should be clear in his mind at all times for just what details he is making her responsible. The sterilisation of instruments, gloves, and linen is arranged by her without any sort of supervision. In most theatres the sister looks after instruments and swabs. The surgeon should be perfectly clear as to whether he is making her responsible to him for the count at the end of an operation; he should also make it clear to the sister whether she is being held responsible. There seems no doubt that the final responsibility rests with the surgeon, but it is essential that someone quick-witted and perfectly reliable, not to say honest, should be present to do the actual business of counting, and to report to him the result. The best person is probably the theatre sister because, being constantly in the theatre and having control of the probationer nurses, she can work out a simple and efficient scheme which is rigidly adhered to at every operation.

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[1] Operating Room Procedure for Nurses and Internes. London: G. P. Putnam's Sons. 1934. Pp. 413. 12s. 6d.

The next important cog in the wheel is the staff nurse. It would result in more efficiency and less worry if this post, in small hospitals as well as in large, could be a semi-permanent one, and if only those nurses were appointed to it who had had special training in theatre technique, and who had proved their ability. The staff nurse has to take charge in the absence of the theatre sister, and this should imply ability to deal with any type of emergency. There are two details of operating-room procedure in which nurses appear to be specially liable to fail. One is moving the patient into one of the special positions, such as the kidney position or the lithotomy position; the other is the adjustment of the operating table. Familiarity with all the mechanism and vagaries of this table should be incumbent on every member of the theatre staff. These are, or should be, matters of regular drill. The theatre sister should not only be efficient herself, but capable of calling forth efficiency in others. It is no testimony to her capabilities that the progress of an operation should be less smooth when she is away than when she is there.

CANCER OF THE BREAST

MANY records have been made of end-results in mammary cancer, but so far few satisfactory deductions can be drawn from them. For this there may be several reasons, such as the variety of treatment adopted at different clinics, the absence of definition of the stage of tumour growth at the time of treatment, and the lack of classification in homogeneous groups. Classification for prognosis in mammary cancer seems indeed a fundamental difficulty. It might be claimed that some objective uniform plan of grouping, such as Jüngling's, is likely to be accurate and suitable for statistical purposes, but any clinical classification without microscopical check is liable to err in regard to axillary involvement. A histological classification, based on the examination of small areas of malignant tissue without reference to the morbid anatomy of the tumour as a whole, is also unhelpful. Uncertainty about the variables which should be selected as the basis of statistical analysis makes it hard to compare figures from different clinics, and probably underlies the variations in survival-rates.

A study by R. B. Greenough and G. W. Taylor,[1] the fourth of a series of reports on end-results in cancer of the breast treated at the Massachusetts General Hospital, is instructive, despite the comparatively small number of cases, because it is based on a more or less uniform treatment and grading at the same centre. Their figures add a comment on various problems; they show for example the influence of age, by emphasising the relatively greater gravity of the disease in younger women, but suggest that the duration of the tumour has only a limited value in group prognosis. For the pathologist, the authors' readjustment of view with regard to histological classification and the degree of malignancy is especially interesting. To their earlier criteria of cellular architecture and cytological character they have added an additional factor, "infiltration," which they regard as a marked step in de-differentiation and thus an indication of high malignancy. But infiltration appears to be a sign not of heightened malignancy but primarily of extension into the surrounding tissues, with greater likelihood of lymphatic vessel invasion—an almost inevitable sequence in advanced cases. This in itself would account for the less hopeful outlook in cases where this "factor" is much in evidence. Axillary involvement was present at the time of operation in 11 per cent. of their Grade I. cases, in 70 per cent. of Grade II., and in 90 per cent. of Grade III., a finding which suggests that infiltration counted as a weighty factor in prognosis.

In considering the treatment of malignant mammary tumours, Greenough and Taylor again emphasise the necessity for the complete radical operation where this is possible: where the diagnosis is in doubt —and this is usually in very early cases—they find no reason to suppose that exploratory incision is prejudicial to cure, provided that facilities for histological examination and the completion of the radical operation, if indicated, are available. Prophylactic X ray therapy was employed, in addition to operation, in most of their more recent cases, and results in these support those from other centres in giving a higher proportion of five-year cures than where no irradiation was given. They hold that increase in the percentage of five-year cures, and avoidance of many of the deaths occurring within six months of operation, may be expected from greater care in estimati[illegible] that palliative irradiation is [illegible] of mortality from cancer of the breast over all cases depends, as has often been pointed out, on the readiness of the profession and the public to take a serious view of any mammary abnormality; though in this connexion it is noteworthy that the percentage operability has remained almost constant for Greenough's series of reports on cases treated since 1894.

ACUTE PULMONARY ŒDEMA

ACUTE pulmonary œdema occurring in heart disease is in this country generally regarded as due to a sudden left ventricular failure leading to congestion and œdema in the lungs. A different view is held by S. Wassermann,[1] who considers it due to a reflex, usually initiated from the aorta or coronary artery, in the cardio-pulmonary portion of the vegetative nervous system, leading to spasm of the pulmonary capillaries. He finds that the condition can be relieved or completely suppressed by pressure on the carotid sinus, and that the attacks, which appear for the most part spontaneously, are accompanied by an increase in pulse-rate and blood pressure and by certain other symptoms which are held to be evidence of sympathetic irritation. Carotid sinus pressure is effective in treatment, it is supposed, principally by producing a counteracting vasodilator reflex on the pulmonary capillaries. Cardiac asthma—a condition not sharply to be distinguished from pulmonary œdema—and angina pectoris we know generally to be associated with a gross pathology similar to that of pulmonary œdema, and Wassermann believes these functional disturbances also to be the result of reflexes, the difference lying in the site of action of the effector, this being the bronchi in cardiac asthma, and the coronary artery in angina. The efficacy of the usual methods of treatment for these syndromes is considered to be better explained on the basis of abnormal reflex action than by the conventional views.

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[1] New Eng. Jour. Med., April 19th, 1934.

[1] Wien. Arch. f. inn. Med., 1933, xxiv., 213.

RESEARCH AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

THE impetus towards surgical research at or in connexion with the Royal College of Surgeons of England has gained force during the last year. The annual report on the museum, research laboratories, and the Buckston Browne Surgical Research Farm records many alterations and advances in organisation and even more constructive plans for the future. The additions to the museum during the year will be on view in a special room for the next three weeks, and are better visited than described. The director of research, Prof. J. Beattie, summarises the investigations actually in progress.

Sir Charles Ballance is recording by cinematography the results of sympathetic-peripheral nerve anastomosis in animals; Mr. Winsbury-White has continued his investigations into the spread of pelvic inflammation; Mr. Mortimer Woolff is attempting to produce intestinal diverticula experimentally: Lieut.-Col. E. P. Argyle has shown that the essential lesion in "roaring" horses is a peripheral neuritis in the left recurrent laryngeal nerve. A field at Downe is being put at the disposal of Dr. R. J. V. Pulvertaft who asked for accommodation for ponies and horses in order to investigate the possibility of producing a serum which would retard the growth of secondary carcinomatous deposits in man. Mr. J. H. Thompson's extracts of the anti-growth factor of parathyroid glands have been found to retard the growth of small, but not of large, tumours in mice. At Downe Dr. D. Slome and Mr. L. F. O'Shaughnessy have been working on surgical shock, Mr. G. C. Knight on the ætiology of achalasia of the cardia, and Dr. Rupert A. Willis on a structural study of teratomata. In connexion with this work over 1000 microscopical sections have been made by Mrs. Willis, and composite maps have been drawn, enabling visualisation of the distribution and relationships of the tissue components of the tumours. The conclusions reached are that the arrangement of the tissues is not wholly fortuitous, that metaplastic changes are of frequent occurrence, and that coöperation between embryologists and morbid anatomists in the minute study of teratomata should lead to important results.

The provision of extended laboratory accommodation for research in the college itself, apart from the farm laboratories at Downe, is being considered, and various schemes to this end are under discussion.

VENTRICULOGRAPHY IN DIAGNOSIS

THE reliance placed on ventriculography as a means of localising brain tumours varies considerably in the practice of different surgeons. Its value is demonstrated, however, in an analysis, by Cobb Pilcher and Hugh M. Wilson,[1] of 97 cases of verified intracranial tumours in which it was applied. The results of this analysis are arranged in three groups. A positive result is recorded when the information obtained was of "localising" or "lateralising" value. The latter term is used to denote evidence that defines the hemisphere in which the tumour is situated but not the lobe involved. A second group is labelled as "indeterminate" and the third "misleading." In the 97 cases a positive result was obtained in 79 instances, an indeterminate in 7 and a misleading in 11. Twelve of the positive results were of the lateralising variety and it is noteworthy that 10 of these were associated with tumours of the temporal lobe. This may be accounted for by the difficulty in getting complete filling of the ventricular system and hence a failure to visualise the whole of the inferior horn. These figures should impress the sceptical with the value of this test in diagnosis. Pilcher and Wilson's conclusion that ventriculography should not be relied upon as a sole means to diagnosis but used as an adjunct to this end is in the best tradition of medical practice.

INTERNATIONAL CONGRESS OF GASTRO-ENTEROLOGY

MANY of the clinical and pathological questions arising out of the diagnosis and treatment of the conditions covered by the term Gastro-Enterology have been gone into before medical séances and congresses, but now an international convention has been planned, to be held in Brussels in the first week of August next year, at which time a universal exhibition will be in progress in the city. Dr. J. Schoemaker will be the president, and a strong local committee has been formed. A division of the subject into sections has been arranged, the coöperation being already secured of leading men in various countries. Those who desire to participate in the debates or to be present at the meeting are asked to communicate with the secretary-general of the Congress, Dr. G. Brohée, 64, Rue de la Concorde, Brussels.

THE SURGERY OF THE ŒSOPHAGUS

A REMARKABLE communication by T. Ohsawa[1] records numerous experiments on animals and operations on man. In one respect his teaching is heterodox: he refuses to employ positive-pressure anæsthesia. Elsewhere it is based on established principles, but the results are unusually good. Though no success was obtained in tumours of the upper reaches of the œsophagus, the successes claimed for those situated below the lung root—some of these invaded the cardiac end of the stomach—are very striking. Healing was secured in 10 out of 19 cases of this type, and in these patients natural swallowing was restored either by end-to-end anastomosis of the œsophagus or by œsophagoenterostomy. To these achievements three factors appear to have contributed: first, Ohsawa recognises that the blood-supply of the lower œsophagus is largely derived from the bronchial arteries, so that a very limited resection is less likely to succeed than one that extends almost up to the level of the bifurcation of the trachea; secondly, he makes use of the large omental graft[2]; and thirdly, he employs free exposure—opening both abdomen and left pleural cavity in all the operations. Sometimes he begins with a left thoracotomy and then enters the abdomen by incision of the diaphragm; in other cases laparotomy is first performed and after section of the costal arch (in the manner of Marwedel) access is gained to the left pleura by incision of the diaphragm from below. In one case of innocent tumour of the œsophagus (myoma) operation was performed with success by [illegible] route. A similar method is [illegible], and he records 12 successful [illegible] type. In a resistant case of simple œsophageal stricture an antethoracic œsophagoplasty was successfully carried out, but most cases responded to dilatation. Many patients suffering from cardiospasm were treated either by œsophagogastrostomy or by the usual plastic operation at the cardia.

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[1] Surg., Gyn., and Obst., June, 1934, p. 995.

[1] Arch. f. Jap. Chir., 1933, x., 605.

[2] The value of this graft as a means of controlling operative infection in the chest was discussed by M O'Shaughnessy in a Hunterian lecture for 1933.

It is clear that, brilliant as is this record, the difficulties of œsophageal surgery are not yet overcome; nevertheless Ohsawa's work is in itself enough to justify further clinical and experimental research. It is significant that the results of operations on the dog were far inferior to those obtained in man—the difficulties of nursing and the recognition of post-operative complications are very great in animal surgery. But it was only the application of the knowledge gained in these experiments that enabled him to do the valuable work he now describes.

MEDICINE AND POLITICS

THE medical school, with its long and continuous tradition, is much older than anything else in education, said Dr. Walter Elliot, Minister of Agriculture, in his address to London Hospital students last Tuesday. Other branches of education are subject to inroads by every form of crank: in the words of Shaw, "He who can, does; he who cannot, teaches." But this is not true of medicine, where the great masters are also great teachers and the student learns not so much from what a man says as from what he does. In politics to-day, he continued, we are looking towards men of education, and the biological training of the medical student is not less valuable than the classical training of the past. Indeed in present circumstances it may be still more valuable: for the Age of Reason is past, and the Age of Unreason is upon us; the Age of Logic is defeated and the Age of Race Consciousness is victorious. "You will have to grapple," he said, "with that new heresy"—with the "pushing of biological catchwords to the verge of insanity" which is wrecking countries to-day. And as trained men confronted with these opinions and situations the former medical student should remember the long international tradition behind him. "The Oath of Hippocrates is an oath of sanity."

A MEMORANDUM has been issued from the Ministry of Health furnishing information as to measures which should be taken for collecting rain-water for domestic purposes. During many past weeks no procedures for the collection and storage of rain-water would have had any result, but it is timely of the Ministry to remind the public that, when the rain does come, all possible pains should be taken to preserve every drop for future distribution. The memorandum points to the neglect prevalent in the collection of rain-water on roof areas, as proved by the wise employment of this supply in many districts, notably in East Anglia, where the inhabitants have for generations depended on rain collected from their roofs for drinking and culinary purposes. This, of course, is only possible where there is little or no industrial pollution. Precise instructions are given by the Ministry as to the storage capacity required and as to price and construction of receptacles. The memorandum can be obtained for 1*d.* from any bookseller.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Vice-Admiral Sir Reginald St. G. S. Bond is placed on retd. list.

Surg. Rear-Admiral R. W. B. Hall is granted the rank of Surg. Vice-Admiral.

Surg. Capts. T. B. Shaw and N. S. Meiklejohn to be Surg. Rear-Admirals and are placed on the retd. list.

Surg. Capt. B. P. Pick to be Surg. Rear-Admiral.

Surg. Comdr. to Surg. Capt.: K. H. Hole, J. G. Danson, J. P. Shorten, H. M. Whelan, and R. F. P. Cory.

Surg. Lt.-Comdr. M. B. Devane to be Surg. Comdr.

B. S. Lewis to be Surg. Lt.

The following appointments have been notified: Surg. Capt. E. MacEwan to *Drake* for R.N.B., Devonport. Surg. Comdrs. M. B. Devane to *Renown*; R. Buddle to *Pembroke* for R.N.B., Chatham; W. A. Jolliffe to *Victory* for R.N.B.; and A. C. V. Green to *Dolphin*.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Comdr. A. G. L. Reade is placed on the retd. list with rank of Surg. Capt.

Surg. Lt.-Comdrs. G. A. Clark and C. C. Elliott to be Surg. Comdrs.

ROYAL ARMY MEDICAL CORPS

To be Bt.-Cols.: Lt.-Cols. W. B. Purdon and F. Casement.

To be Bt. Lt.-Cols.: Majs. J. G. Gill and W. H. Hartgill.

Maj. E. P. Allman Smith to be Lt.-Col.

Maj. E. C. Stoney, Reg. Army Res. of Off., relinquishes his appt. under Art. 520 (*b*), Royal Warrant for Pay and Promotion, 1931.

Lt. T. McG. McNie to be Capt.

Maj. (Temp. Commn.) E. K. Campbell relinquishes his commn. and retains the rank of Maj.

Lt. (on prob.) R. S. Vine is secd.

CAVALRY—LIFE GUARDS

Surg. Lt.-Col. E. J. H. Luxmoore, having attained the age for retirement, is placed on retd. pay.

Lt.-Col. E. A. Strachan, from R.A.M.C., to be Surg. Lt.-Col.

ARMY DENTAL CORPS

R. H. Green to be Lt. (on prob.).

TERRITORIAL ARMY

Capt. J. C. Andrews resigns his commn.

Lt. M. C. Hounsfield resigns his commn.

Lts. D. M. Dunlop, A. S. Henderson, I. G. W. Hill, J. A. Matheson, and F. H. Taylor to be Capts.

A. C. Armstrong, D. Campbell, and J. T. Watkins to be Lts.

ROYAL AIR FORCE

The undermentioned promotions are made: Wing Comdrs. to be Group Capts.: F. C. Cowtan, W. A. S. Duck, and A. E. Panter.

Squadron Leaders to be Wing Comdrs.: J. T. T. Forbes, J. Kyle, A. F. Rook, E. A. Lumley, W. G. L. Wambeek, and T. C. St. C. Morton.

Flight-Lt. (Hon. Squadron Leader) to be Hon. Wing Comdr.: J. Valerio.

MENTIONED IN DESPATCHES

For distinguished services in connexion with the operations against the Upper Mohmands, July-October last year, the names of Col. E. W. C. Bradfield, I.M.S., Asst.-Director of Medical Servics, Peshawar District, and of Maj. F. R. H. Mollan, R.A.M.C., and Maj. A. E. Richmond, R.A.M.C., have been brought to the notice of the Commander-in-Chief in India, H. E. Field-Marshal Sir Philip Chetwode.

COLONIAL MEDICAL SERVICE

Dr. E. M. Astwood has been appointed Medical Superintendent to King Edward VII. Hospital, Bermuda, and Dr. C. J. Fournier, Medical Officer, Bermuda. Dr. W. Hughes has been appointed Medical Officer in the Federated Malay States. Dr. J. C. J. Callanan has been promoted Senior Medical Officer, Kenya, and Dr. A. T. Kuriyan, Provincial Surgeon, Ceylon.

PROGNOSIS

A Series of Signed Articles contributed by invitation

X.—PROGNOSIS OF RAYNAUD'S DISEASE

SINCE it is impossible to foretell the fate of any patient until his disease has been identified, the problems of diagnosis should have no place in an article devoted to prognosis. When dealing with Raynaud's disease, however, it is necessary to refer to two circulatory disorders which, while mimicking its manifestations run a very different clinical course.

DIFFERENTIAL DIAGNOSIS

The first is the complaint commonly referred to as "dead fingers," in which some or all of the digits when exposed to a cold and damp atmosphere assume a waxen pallor. There is frequently an hereditary element, a daughter being particularly likely to inherit the disorder from her father. The fingers never become blue, there is little or no pain, and the main complaint is of numbness, and of the unpleasant appearance of the fingers. In spite of the apparently complete arrest of the circulation from time to time, ulceration or gangrene of the fingers never occurs. Chalky deposits may form in the subcutaneous tissue as a result of ischæmia, but as this is a very rare complication, "dead fingers" need never cause anxiety. Though Raynaud included such cases in his original treatise, they are now regarded as a separate clinical group.

Secondly, in certain cases of primary structural disease of the arteries, cyanosis of the digits may occur as a result of exposure to cold, and this may lead to an error in diagnosis. The earlier stages of thrombo-angiitis obliterans of the vessels of the upper extremity may resemble Raynaud's disease very closely, and in older patients arterio-sclerosis may give rise to similar colour changes in the fingers and toes. These diseases are steadily progressive, leading to gangrene of the greater part, or even of the whole of several digits, and it is most important that they should not be confused with Raynaud's disease in which such extensive gangrene is never seen.

Of those afflicted by Raynaud's disease over 90 per cent. are women, and this sex-incidence must be borne in mind if errors in diagnosis are to be avoided. Almost all the men whose symptoms resemble those of Raynaud's disease are actually suffering from some form of obliterative arteritis.

TWO GROUPS OF CASES

The questions which the sufferer from Raynaud's disease will ask are whether she is to expect the disease to become steadily worse or to tend towards spontaneous recovery; whether ulceration will extend deeply and lead to gangrene of the fingers; whether all the digits are likely to become ulcerated to an equal extent; and whether the benefit to be expected as a result of sympathetic ganglionectomy will justify the operation.

It is commonly stated in text books that the mildest form of the disease will run its course in a few years, leaving the patient subsequently free from abnormal sensitivity to cold. This view is almost certainly fallacious, the tendency being for the symptoms to become more pronounced as age advances; but in a large percentage of cases the malady is not progressive. The most important factor in prognosis is the rate of progress of the disease in the first 2 or 3 years. If by the end of that period there are no trophic changes in the fingers it is most unlikely that these will appear later. It is thus possible to divide all patients suffering from Raynaud's disease into two groups: those who develop ulceration of the finger tips and scleroderma after 2 or 3 winters and for whom the outlook is bad, and those who show little or no tendency to trophic disturbances and who with reasonable care should be able to escape these complications indefinitely.

The improvement which occurs when a patient is living for a time in a warm climate may cause her to think that the disease has undergone spontaneous cure, but disappointment on returning to colder surroundings is inevitable. If, however, a patient is able to make her home permanently in a warm climate she may do so with the assurance that she will derive more benefit from the move than from any other form of treatment, and if the temperature is uniform she is likely to remain free from attacks. Even in this country the choice of occupation may have a considerable influence upon the attacks, though the advantage of working for part of the day in warm surroundings is not to be compared with the benefit of living in a warm climate. It may be helpful, however, if the patient can work in a kitchen or in a restaurant rather than in a warehouse or in the open air, and it is to be noted that typewriting seems to be a particularly unsuitable occupation for those who suffer from Raynaud's disease.

THE TYPE OF LESION

The ulcers which occur in uncomplicated Raynaud's disease remain shallow, healing in warm weather and recurring when a cold spell produces another "attack." Since ulceration and scleroderma are associated with permanent structural changes in the coats of the small arteries these complications will become more severe should any other form of arterio-sclerosis supervene. Massive gangrene is unknown, and should it be necessary to amputate a digit on account of painful ulceration, sound healing of the stump is to be expected. The disease very rarely ends fatally, but infection spreading from an ulcer is a possible cause of death.

Though all the digits become cyanosed in an attack it is remarkable that some suffer more severely than others. The thumb is usually the least affected, but the fingers vary considerably as regards the intensity of the cyanosis and the incidence of ulceration. Two or three fingers of each hand may remain free from complications for many years, and there is always a good chance that they may escape entirely. Should it be necessary, therefore, to amputate a badly ulcerated finger, the operation may be undertaken in the reasonable hope that complications of equal severity will not occur in the remaining fingers.

EFFECT OF SYMPATHETIC GANGLIONECTOMY

In predicting the effect of cervico-thoracic sympathetic ganglionectomy it may be taken as a general rule that the more severe the disease the less satisfactory will be the result of the operation. The severity of the disease varies directly with the degree of susceptibility to the action of cold, and this is not abolished by sympathectomy, the beneficial effect of which depends on paralytic vasodilatation. In the most severe cases, which are complicated by extensive ulceration and scleroderma, structural changes occur in the small arteries, and full vasodilatation becomes impossible. Thus, though symptoms are relieved in almost all cases, the improvement is most marked when susceptibility to cold is of moderate severity and trophic complications are minimal. Operation will not be called for in the mildest cases because the disease is not progressive; it will be contra-indicated in the most severe form of the disease because the degree of vasodilatation obtainable will prove an inadequate safeguard against future attacks; but it will produce most gratifying results when the disease, though progressive, is of only moderate severity. Lumbar ganglionectomy can be relied upon to relieve the symptoms in the feet in all cases, the success of the operation being not only more *certain* but also more complete than that of cervico-thoracic ganglionectomy.

Though the hands may still become blue and cold after sympathectomy, the patient will no longer be debarred from working at various household and other occupations which necessitate exposure to cold, since prolonged exposure to more intense cold will be required to produce the attacks after operation. Besides the regaining of the use of the hands, one of the greatest benefits enjoyed as a result of operation will be the abolition of the pain previously experienced during the attacks of cyanosis and the period of recovery following them.

Operations for sympathetic ganglionectomy are practically free from risk to life, but there are certain drawbacks of which patients must be warned beforehand. For two or three months after cervico-thoracic ganglionectomy there is often troublesome aching pain in the shoulders and arms, and insomnia may be a disturbing feature, but both these complications, which seem to be due to a temporary upset of the circulation in the arms and in the brain, clear up spontaneously, though they may be severe enough to delay the patient's return to work for some weeks. The ocular manifestations of bilateral cervical sympathetic palsy are neither a handicap nor a disfigurement. After bilateral [illegible] male patients, though still pote[illegible] sterile. The effect on the colon is to cause a moderate increase in its activity, which is usually rather an advantage, and incontinence of urine or fæces never occurs. These post-operative complications will not contra-indicate operation if the patient is suffering much pain and disability, but might cause one to hesitate before advising operation in the milder cases of Raynaud's disease.

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SPECIAL ARTICLES

MARIE CURIE

The death occurred on Wednesday, July 4th, of Marie Curie, the joint discoverer of radium. The event occurred at the *sanatorium* of Sallanches (Haute-Savoie); she was 66 years of age.

Marie Curie was one of the group of discoverers which has, during the twentieth century, thrown new light on the fundamentals of physics. She may be said to have been inducted as a baby into the career which she was predestined to follow. The daughter of Prof. Sklodowska, of Warsaw, she was as a child familiar with laboratory work, and soon became her father's assistant. Possible involvement in political troubles under the Tsarist régime led her to leave Warsaw for Paris, where she obtained a post in the research laboratories at the Sorbonne. She rapidly became licencié ès Sciences Physiques et Mathématiques, and duly proceeded to the doctorate. In 1895 she married Prof. Piérre Curie, who had already publicly recognised the pre-eminent qualities of her scientific work, and they laboured together on the researches which culminated in the momentous discovery of 1898. The story of this discovery has often been told, but the principal epochs in it are as follows.

Henri Becquerel, in 1896, discovered that the crystalline double sulphate of uranium and potassium emitted a type of radiation which could penetrate a plate of silver opaque to light. He followed up this discovery by showing that the crystalline state had nothing to do with the phenomenon, and, further, that it was exhibited by the metal uranium itself. He suggested, to indicate the new natural manifestation, the felicitous term "radio-active," which is still retained for the large class of bodies which have been discovered in the intervening years. The outstanding work of Madame Curie, during an active collaboration with Prof. Piérre Curie, was the separation and identification of two new elements, one comparatively short-lived, named polonium after her native country, the other radium, which by the special circumstance of the length of its "average life," stands out conspicuously among the whole range of radio-active substances. Now, a substance like uranium is very feebly radio-active; on the whole, its atoms are breaking up exceedingly slowly—a gramme of the element would only decay to half this value in five thousand million years. Hence uranium is found in quantity; on the other hand, radon, the gas from radium, is transformed to half its value in just under four days, so that no really large quantity is available. From a gramme of radium the maximum volume of radon is just over half a cubic millimetre. Radium stands not only genetically between these two substances, but while being much more radio-active than uranium it is much less so than radon. Hence, ponderable quantities are available. The extraction of radium by Madame Curie from the pitchblende residues put at her disposal from the State manufactory of uranium in Bohemia, was a piece of work calling for the greatest skill, inventiveness, and patience. Within a few years of this discovery radio-activity became one of the most important phenomenon of physics.

Two outstanding matters in this connexion should be mentioned: first, the discovery by Lord Rutherford that thorium (the radio-activity of which was identified independently by Madame Curie and G. C. Schmidt) spontaneously gave off a radio-active gas; and, secondly, the vital interest to medicine of the application of X rays and radium. Those bold spirits, who had taken their courage in their hands and applied X rays to the body in therapeutic fashion, were not slow to do the same with radium once the similarity in the types of radiation was known. In 1910 the first International Congress of Radiology was held in Brussels, when the proceedings were attended by 500 delegates drawn from all quarters of the globe, Madame Curie, Rutherford, and Soddy being among the adherents to the new science. The congress asked Madame Curie to prepare a sample of pure metallic radium and to take the initial steps towards realising a standard of radium quantity. This was done in a remarkably short time, and physical laboratories were for the first time in a position to make accurate measurements of quantities of radio-active bodies on an agreed basis. Further, the congress, planning to institute a practical unit of radium emanation (radon), desired to honour the name of Curie by associating it with the unit. A curie was designated as the quantity of radium emanation in equilibrium with one gramme of radium element. As so often happens with the practical units of the physicists, paradoxical though it may seem, a submultiplier of the unit—e.g., milli-curie—is more often used than the unit itself.

For the ten years of their married life she and her husband worked hand in hand, the association being terminated by the tragic death in 1906 of Prof. Curie in a street accident; but already she had, in association with him and Becquerel, been in receipt of the Nobel prize. She continued to work, at first alone, and later with various assistants and a daughter, and published researches in many scientific periodicals on the phenomena of radio-activity. In 1911 she received again the Nobel prize for her chemical researches, while the Royal Society conferred on her the Davy gold medal. Learned academies followed suit, and few can have enjoyed so many of these honorary distinctions as Marie Curie, but no parallel receipt of wealth rewarded her efforts although the French Government provided her with a laboratory in the Rue Piérre Curie; but in 1929 a present of £10,000 was received from women admirers in the U.S.A., enabling her to devote herself without anxiety to the labours which absorbed her. Madame Curie, during her later scientific years, saw a new era initiated by the work of her daughter, acting in collaboration with M. Jolliot, her husband. They discovered, contrary to the opinion held for over 30 years, that some substances could be made radio-active. It is true that the effect is a very small one and lasts for a comparatively short time, things which in no way detract from the importance of the discovery, while history would seem to show that the beginnings of great things are often of very modest dimensions. It was a happy finale for Marie Curie to see her work being continued so brilliantly in the family circle.

Madame Curie was a great scientific figure and her name will live as one who enriched the fields of science and added a weapon to those previously wielded by medicine in its fight for health.

INTERNATIONAL HEALTH AGREEMENTS

THE WORK OF THE OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE (PERMANENT COMMITTEE)

SEVERAL matters of interest are dealt with in a résumé just issued from the Office International d'Hygiène publique in Paris on the proceedings at the April–May session of the permanent committee of that body, which was attended by the delegates of 39 Governments under the presidency of Sir George Buchanan. The work, as in previous sessions, concerned in part the settlement or application of international agreements between governments on health questions and in part a comparison of data on topical questions of epidemiology and hygiene.

INTERNATIONAL AGREEMENTS

In the first of these categories came the question of standard quantities to be recommended in the case of ships being deratised by sulphur for the purpose of the International Sanitary Convention of 1926.

Deratisation.—The committee agreed to a report to be presented to health departments concerned dealing separately with fumigation by burning sulphur, by burning mixtures of sulphur and charcoal, by sulphur dioxide in cylinders, and by the use of the Clayton apparatus. Special attention was given to the allegation that jute sacks or gunny bags loaded in Calcutta had been responsible for the importation of plague into various places on the coast of South America. Suspicions of this method of transmission were supported by circumstantial evidence, but the Committee was unable to regard the thesis as fully proven, and recommended its further consideration when additional data are obtained by the Pan-American Sanitary Conference which will be held at Buenos Aires in November.

An opinion was expressed adverse to giving certificates that ships have been effectively deratised when the holds of the ship have not been emptied before the deratisation process. Some agreements between individual countries for facilitating quarantine operations were noted and facilitated. Among these is a system by which in northern European ports from Brest to the mouth of the Elbe, including British ports, the port sanitary authorities follow a system of direct communication one with another in regard to infectious diseases on ships. A more important agreement, particularly from the shipowners' point of view, is that by which a considerable number of countries are now concluding an accord to dispense either with the production of a bill of health or, at least, with the requirements that bills of health should bear visas obtained from their consuls in foreign ports.

Air Traffic. Yellow Fever.—In connexion with the extension of international health regulations to air traffic which has been effected by the Hague International Sanitary Convention for Aerial Navigation, 1933, the committee gave its attention to evidence that on some air routes mosquitoes are habitually carried from country to country by aircraft, and decided on a study of the most effective methods of clearing aircraft from these insects. Note was also taken of the progress made in the application of the mouse protection test in regions of Africa to determine whether particular regions show evidence of the existence within recent years of the virus of yellow fever infection. A study was undertaken of the significance in this respect of what are termed "silent areas"—i.e., those in which a material proportion of positive results to the mouse protection test are obtained but in which there has never been evidence of the actual presence of yellow fever. An investigation of the several questions arising out of these findings is being pursued.

Venereal Diseases. Opium.—The International Agreement of Brussels, 1924, which provides for the treatment of merchant seamen suffering from venereal diseases, received further attention, and a modified form of the international card given to the seaman has been proposed to the signatory Governments. Finally, the Committee reverted to a previous decision that for the purpose of the Opium Convention of 1925 an exemption should be made for ampoules of sterilised solutions of morphine and atropine containing as maxima 2 per cent. of morphine salt and 0·05 per cent. of atropine salt. It appeared that there was some risk of the use of these preparations as drugs of addiction, even when put up in this way. A further investigation was decided upon.

TOPICAL QUESTIONS OF EPIDEMIOLOGY AND HYGIENE

The second branch of the work of the session needs less notice since the different contributions on epidemiological and public health subjects will in due course be published in the monthly *Bulletin* of the Office International d'Hygiène publique. Notable among these contributions are reports from the Yellow Fever Commission of the Office based on work in Africa and America, associated with that of the Rockefeller Foundation, on the distribution and transmission of yellow fever, including a discussion of the "silent areas" above mentioned. Recent work on vaccination against yellow fever by attenuated viruses and by the serum of immunised horses was reviewed.

Cholera.—The question of the degree of danger presented by the healthy carrier of cholera vibrios, or vibrios allied to them, constantly arises in quarantine practice, and comes repeatedly before the Committee. A new stage was reached at the present session. It was announced to be the intention of the Indian health service, with the aid of the Indian Research Fund Association, to follow the recommendations pressed at previous sessions, and that a carefully planned scheme of work on typical and atypical vibrios will now be undertaken in suitable areas in India under conditions which permit the bacteriological results and the appearance of clinical cholera to be studied in association. Special attention will in this connexion be given to typing by sugar fermentation and also to the use of serums prepared from a heated antigen, as proposed by Bruce White. The Committee had been asked to specify the dosage of cholera vibrios necessary where protection has to be given by a single inoculation. With certain cautions and reservations, it adopted the figure of 8000 millions as an average dose for this purpose. A proposal to give official recognition to cholera prophylaxis by the administration of vaccine per os was rejected.

Small-pox and Vaccination.—An omnibus report presented by the subcommittee on small-pox and vaccination on modern methods of vaccinating and the effects of vaccination was accepted and will shortly be published. Further contributions were received on neurovaccine, and on dried vaccine, as well as on vaccine virus grown on the allantoic membrane of the hen's egg in incubation. The latter included a report by Goodpasture and others, presented by the delegate for the United States, covering some 1000 vaccinations done with this virus in schools in Tennessee, which yielded normal results and an insertion success of 94 per cent. The Committee considered that it remains desirable to destroy lymph from calves which, on post-mortem examination after the collection of lymph, are found to have tuberculous lesions.

Virus Diseases.—Some new epidemiological data regarding the increase of typhus in several countries were supplied; note was taken of the general interest which attaches to the work of Wilson Smith, Andrewes, and Laidlaw on the nature of the influenza virus, and arrangements were made for further international studies of the incidence of Weil's disease and leishmaniasis in Europe and along the basin of the Mediterranean. The present distribution of psittacosis shows that the particular preventive measures taken in the several countries affected need to be adjusted to very different circumstances, and that, while there has been a definite gain to European countries by their having acted together in 1931 to prohibit all importation of parrots at their ports, this joint action no longer has the importance which it then possessed.

On more general questions of hygiene it may be noted that a report is to be presented on the practice and results of "terminal disinfection" in different countries.

ROYAL SANITARY INSTITUTE

THE annual health congress of this institute was held at Bristol on July 9th–14th. The inaugural address was delivered by Mr. S. H. BADOCK, pro-chancellor and treasurer of the University of Bristol, who sketched the history of preventive medicine and outlined the present position of the fight against disease. He pointed out that the general attitude to the physician was still too often that of the woman who showed her bathroom to her visitors remarking: "Thank God, we have never had to use it yet." He criticised the long intervals between school medical examinations, the lack of correlation between school medical services and adolescent health care, and the prevalence of tuberculous milk.

The Presidential address to the section of preventive medicine was delivered by Prof. W. W. JAMESON, who recounted his experience in a tour through India and Malaya. The first problem that attracted attention, he said, was due to the magnitude of the population: more than 350 millions of people lived in India and only 17 per cent. of the men and 2 per cent. of the women were literate. There was a fairly comprehensive system of curative medicine, and research work of the highest class was in progress, but there was a lack of advance in sanitation and preventive medicine. Until the people had reached a higher educational and economic level some powerful force from the Central Government was necessary. The religious and political problems added enormously to the difficulties of public health workers, but Malaya was far less troubled by such problems, and the experience of rubber growers that antimalarial work was good business had greatly helped the sanitation of the country.

NUTRITION

Dr. H. E. MAGEE spoke on nutrition and the public health, emphasising the close association between these two subjects and deprecating the lack of coöperation between physiology and public health. There had been much research work on animals but not enough on mankind. A criterion of normality was urgently needed and a test for the early departures from normal. The many and discordant methods employed in the artificial feeding of infants showed that the correct method had yet to be discovered, and there was still a conflict as to the ætiology of dental caries. Ignorance and prejudice—as well as poverty—played a large part in malnutrition. Public health was more than a science, it was partly an art, and nowhere would the health officer be called upon to exercise his art more skilfully than in educating his people to correct dietetics and in breaking down prejudice and fads.

Prof. R. H. A. PLIMMER, speaking on the same subject, discussed the total quantity necessary for nutrition and the special importance of salts and vitamins.

The presidential address to the section of hygiene of food, which met in conjunction with the food group of the Society of Chemical Industry, was delivered by Mr. L. H. LAMPITT, D.Sc., Chairman of the Group. His remarks concerned the manufacture of ice-cream, and he declared that there was no reason why this increasingly popular material should not be kept absolutely sanitary.

Mr. J. MATTHEWS, of the Aluminium Plant and Vessel Co., also read a paper on ice-cream, showing the developments which have taken place and are still taking place in the equipment for preparing and distributing this commodity. The manufacturer has to provide plants for cleaning and sterilising and finds stainless steel almost ideal; the engineer, however, finds it rather difficult to handle. The ingredients have to be pasteurised, mixed, homogenised, and finally cooled. Mr. Matthews described the various pieces of apparatus which had been found most satisfactory for the divers processes. The adoption of package ice-cream was, he considered, a great step forward and all phases of production were being speeded up. The temperatures used were being carried to still lower levels and modern processing equipment gave ease and certainty of bacteriological control.

Mr. J. R. BARKER, M.R.C.V.S., discussed the legislation concerning milk, and claimed that the milk from tuberculin-tested herds was safer than pasteurised milk from the point of view of tuberculosis risk. He also pointed out that there were pecuniary advantages in establishing tuberculin-tested herds, even under the present milk marketing scheme.

He urged clearance of slum cowsheds and the encouragement of the rearing of cattle free from tuberculosis and provided with a resistance to it. Breeders and rearers of beef cattle knew how to do this and the knowledge was available to the dairy herdsman.

MATERNITY, CHILD WELFARE, AND SCHOOL HYGIENE

Dame Janet Campbell read the presidential address to this section, reviewing the history and present position of the services. She concluded that substantial progress had been made and that permanent services had been established which would compare very favourably with anything done in other countries. The machinery set up had contributed materially to an additional improvement in the physique of children and had unquestionably saved many women and children from serious damage to health and nutrition. At the same time it was important to appreciate the incompleteness of these services and the impossibility of expanding them without the coöperation of local authorities.

Dr. J. Greenwood Wilson asked the question: "Does breast feeding matter?" and answered that modern medical literature showed a divided opinion on this subject. Probably the truth lay between two extremes. Breast feeding had great advantages which should be recognised by medical men and pointed out to their patients, but on the other hand they must recognise the restrictions it placed upon the mother and realise that the individual woman must be studied, just as the individual child must be studied when the feeding was artificial.

POSTURE

Miss M. Forrester-Brown spoke on posture and its relation to health, pointing out that a child's natural instinct kept it rolling on the ground, climbing, swinging, turning somersaults, and dropping to sleep after meals, but that school routine reversed all this. Yet we were surprised after nine years of this treatment to find young lads and girls lacking in initiative and enthusiasm for work. Many American colleges had started departments for dealing with this aspect of education, and industrial firms had prospective workers graded as to posture and body build so that they might be put to work suitable to their type. Artists and writers had paid much attention to bodily posture, and it seemed strange that the subject should have been much neglected by educationists and gymnasts. Far too many of them even now seemed to think that the aim should be strength in individual muscles instead of that exquisite balance among many muscle groups which gave poise both in movement and in repose. Miss Forrester-Brown then explained the right way of standing, sitting, and lying, and pointed out that the attitude induced by the ordinary lounge chair should never be used, for it over-stretched the spinal joints while crowding up the abdominal organs and interfering with the full expansion of the lungs. The chief single factor in maintaining good posture was the tone of the abdominal muscles balancing the back muscles. The balance of the trunk was the same for practically all varieties of exercise; the spine was intended to be used as a spiral spring, but never to bend as a hinge. The best exercise to tone the abdominal muscles was the full, deep breathing of the Italian singers' type, learnt lying down. The importance of rest and of education in balance showed that manual labourers should take their recreation in light sports demanding coördination and skill, while the sedentary worker needed more vigorous exercise.

MENTAL HYGIENE

The problem of the mentally defective was discussed by Dr. H. Herd, who described it as a multi-factorial one. The defective had to be considered as an individual, as a member of the present community, and in relation to the community of the future. There was still inadequate ascertainment of defectives of school age, too much education of the ineducable, and a danger of high-grade cases being assessed above their merits and therefore not officially ascertained. Dr. Herd discussed the evidence before the Departmental Committee on sterilisation and approved its findings, while holding that voluntary sterilisation would leave the problem as large and as clamant as before. The defective, particularly the high grade, had possibilities which had not yet been fully exploited; socialisation could be made a practical policy. For the pathological low grade he put in a plea in favour of euthanasia.

Dr. Isabel G. H. Wilson pointed out the wide relationship between the Mental Treatment Act and maternity and child welfare. The pregnant woman might often benefit by treatment as a voluntary patient. Puerperal cases were suitable for temporary treatment. The Urgency Order, now extended to the rate-aided patient, enabled the authorities to remove from home a violent or frantic patient who was terrifying or even endangering her children. The mother, returning after treatment, might be unable or unfit to look after her home and family; here the provisions of the Act relating to after-care came to their aid.

Miss F. B. Udell described the value of the health visitor in health propaganda. In her opinion leaflets were extremely useful, but the widespread distribution of health literature without verbal instruction thereon was of little or no value. Much good work could be done by group instruction at clinics about sewing, housekeeping, cooking, economical and wise shopping, feeding and care of infants, infectious diseases, the value of prophylactic inoculation, dental caries, and defective vision. Every point must be followed up in the individual home. The teaching of the health visitor must be done in such a way that it stimulated the natural desire for knowledge inherent in all women.

MEDICINE AND THE LAW

Misreading of a Label

An unfortunate misreading of the label on a drug bottle was investigated at a Birmingham inquest last week. The jury returned a verdict of death by misadventure, attributing negligence to the sister in charge of the hospital ward concerned, but making it clear that the negligence did not amount to gross and culpable negligence. A 20-months-old child had been brought to the hospital suffering from throat obstruction. Its breathing had been so seriously affected that it was almost dead on arrival. An operation was performed to permit breathing from below the point of obstruction; an anæsthetic was not necessary. Artificial respiration succeeded and the child began to breathe again. The obstruction freed itself; the child vomited and a piece of bone was dislodged. Later the child became restless and the sister in charge of the ward sent for the resident surgical officer who ordered a dose of nepenthe. The sister poured out a dose from a bottle on which the dose was labelled as "Five minims to 40 minims."

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[illegible] S. MEDICAL COLLEGE,
[illegible]ARY, JAIPUR.

She misread this, as she afterwards realised, as having stated "five minims in 40 minims." She thought the drug was diluted down to one in eight. The dose ordered by the surgeon had been five minims. The consequence of her mistake was that she gave a dose eight times too strong. There was evidence that the bottle was of an unusual type with which the sister would be unfamiliar. The foreman of the jury said that the jurymen were satisfied with the arrangements made at the hospital for dealing with drugs. It was evidently, as the coroner observed, one of those human errors which no training or precautions can entirely eradicate. The incident shows the importance of obtaining the utmost possible standardisation in labelling.

IRELAND

(FROM OUR OWN CORRESPONDENT)

UNIFICATION OF NATIONAL HEALTH INSURANCE

At the opening of the new offices of the Unified National Health Insurance Society on July 7th the chairman of the society, Mr. D. O'Donovan, stated that during the past six months 25 approved societies had been transferred to the Unified Society, including 10 of the largest which operated in the Irish Free State. The total membership transferred was about 310,000, to which were to be added 20,000 new entrants to insurance. About three-fourths of the insured population were now in the society. He hoped to have the remaining societies transferred during the next six months. The chairman went on to criticise the present system of flat-rate insurance, which, in his opinion, rendered their energies unproductive. He regarded it as essential that benefits should be related to the social and financial position of the individual insured person. He hoped that before long they would have a comprehensive scheme of insurance embracing all workers within its scope regardless of their rates of remuneration. Mr. Sean T. O'Kelly, Minister for Local Government and Public Health, in declaring the building open, said that he looked to the unification of national health insurance as laying the foundation of a new scheme of social insurance in general for the people of the country.

A HOSPITAL VENTURE

It was announced last week that the authorities of St. Vincent's Hospital, Dublin, have purchased a demesne of some 45 acres at Elm Park, Merrion, some 3 miles from the centre of Dublin. The property, formerly a seat of Lord ffrench, has recently been used as a golf-links. No statement has yet been made about the intentions of the hospital authorities in regard to their new purchase, but it is believed that St. Vincent's Hospital will eventually be transferred from St. Stephen's Green to the new site. The hospital, which celebrated its centenary a few months ago, is greatly cramped for space in its present site, and has no possibility of extending its borders.

CORRESPONDENCE

BACTERIOPHAGE IN CHOLERA

To the Editor of THE LANCET

SIR,—May I draw your attention to a slip in your very kind and valuable editorial on Bacteriophage in Cholera in THE LANCET of July 7th. Referring to cholera in the untreated and treated districts of Darrang and Nowgong the writer says :—

> "The figures show that in Darrang the death-rate, taking the average of three-year periods, fell steadily from 1924–26 to 1930–32 and in 1930–32 was lower than had ever previously been recorded, though remaining at a level considerably above that of Nowgong."

The three-year period cholera death-rates per 10,000 for these districts were :—

	Deaths per 10,000 per annum.	
	Darrang.	Nowgong.
1923–25	8·9	12·2
1924–26	11·6	14·6
1925–27	16·1	24·3
1926–28	11·7	15·7
1927–29	9·6	14·4
1928–30	4·5	4·3
1929–31	4·3	2·9
1930–32	6·0	0·7

The treatment of Nowgong with phage began in December, 1929. Perhaps you will kindly draw the writer's attention to these, for the comment as it stands might mislead those who have not access to the original paper.—I am, Sir, yours faithfully,

J. MORISON.

London, July 7th.

⁂ *Moving* averages were not referred to in our article, but actual averages for each three-year period. Thus the average annual death-rates of Darrang were 11·6 in 1924–26, 9·6 in 1927–29, and 6·0 in 1930–32, while the corresponding rates in Nowgong were 14·6, 14·4, and 0·7. The rate in Darrang in 1930–32 is lower than any recorded in the consecutive three-year periods back to 1906 and, roughly, only half the rate for 1924–26. These figures, we suggest, bear out the comment in our leading article.—ED. L.

THE DISTRICT ALMONER

To the Editor of THE LANCET

SIR,—I was glad to see both in *The Lancet* and in the *British Medical Journal* of June 30th a reference to the value of the hospital almoner, and a suggestion that there should be district almoners.

I have long held the view that some extension of the almoner service to others than those who happen to be attending a hospital was desirable. In the course of my work (though quite outside it) I am not infrequently written to or rung up and asked to put people in touch with organisations or institutions able to help. Sometimes I can do so, but generally my only course is to write to one of the lady almoners whom I happen to know and who invariably give me all the help or information that is necessary. When, as sometimes happens, the inquirers are in perfectly good financial circumstances, there seems no reason why they should not pay a fee for such information. They would, I feel sure, gladly do so and money so raised would go towards meeting any expense involved in placing at the disposal of all who might wish to take advantage of them, services that can do so much to smooth out difficulties that are common to all. At the moment these services are restricted to one class of the community.

I am, Sir, yours faithfully,

R. H. P. ORDE.

The British Hospitals Association, Grosvenor-crescent,
London, S.W., July 5th.

THE ST. JOHN CLINIC

To the Editor of THE LANCET

SIR,—To your note on the Order of St. John of Jerusalem in THE LANCET of June 30th, which showed the close association between the Order and the medical profession, might well be added the fact that the Order is now in control of this clinic, which formerly was called the London Clinic, and is now named St. John Clinic and Institute of Physical Medicine. While the Red Cross has its clinic in Regent's Park for the treatment of rheumatic and allied conditions, so the Order of St. John has one in Pimlico. The clinic is giving about 3000 treatments per week, and is serving a very real need in providing methods of treatment by the expensive apparatus used in physical medicine, which the patient is unable to obtain from his panel doctor.

During last year there was added to the clinic an X ray department and three new baths, including a paraffin wax bath which is of new design and affords great relief to patients; 112 treatments were given last week with this paraffin wax bath, and all the patients seem to bless its influence.

I am, Sir, yours faithfully,

LEONARD HILL,
Supervisor, St. John Clinic.

Ranelagh-road, London, S.W., July 6th.

A DISCLAIMER

To the Editor of THE LANCET

SIR,—My attention has to-day been drawn to an article in the *Empire News* which refers to me by name and prints my photograph. I was entirely ignorant of the whole matter till to-day, nor have I the slightest knowledge as to how the material for the article, or the photograph, were obtained.

I am, Sir, yours faithfully,

Harley-street, W., July 10th. HENRY YELLOWLEES.

PANEL AND CONTRACT PRACTICE

Clerical Work

THE Glamorgan insurance committee recently recommended that £10 should be withheld from a practitioner's remuneration because of failure to comply with regulations requiring him to send in records on request and failure to reply to communications addressed to him by the clerk. He had been interviewed by the committee on a previous occasion, when he had promised to post off the records required the same night. He did not do so. This type is quite common in the insurance world, and it does no good to the profession when these facts are published in the daily press. While there may be no reflection upon the doctor's capacity professionally they do reflect on his organising ability. The keeping of records and the answering of letters promptly are very largely questions of method and temperament. If a practitioner dislikes this kind of work—which incidentally is important to his whole practice apart from his insurance obligations—he will often find that the services of a secretary, even for a few hours a week, are sufficient to free him from much worry and anxiety. Furthermore, in getting this help he will be assisting his brother practitioners, for they require the record cards he fails to send. Lastly, there is no disputing the fact that a prompt and courteous correspondence with the clerk of the insurance committee—who, after all, is only carrying out the committee's instructions—puts him in much better favour with that tribunal's medical service subcommittee if and when they have to deal with some complaint against him. The small outlay required will amply repay itself in the end.

The Causes of Incapacity for Work

The Department of Health for Scotland has just issued its third report on illness in the insured population. It deals with the year ending on June 30th of last year.

In a population of 1,768,872, the total volume of incapacitating sickness was over 18 million days, being 10 per cent. more than for 1931–32. The increase is greater among men than women, and among women it relates only to the unmarried, since the married show an improvement of 5·8 per cent. It is partly attributable, no doubt, to influenza, but this cause in fact accounts for only 30 per cent. of the increase in days of work lost. The balance is almost entirely due to an increase in the average duration of illness, which was 9·44 days for males, 12·36 for females, 11·05 for single females, and 21·52 for married. Among the causes of incapacitating sickness respiratory disorders amount to some 45 per cent., and they account for 23 per cent. of the total days lost. As regards duration of incapacity, influenza generally takes 15 days; appendicitis 59; pregnancy 40; nervous debility 80; and neurasthenia 122. The following figures denote the number of cases per 100,000 insured persons.

—	M.	F.	Average duration in days.	
			M.	F.
Tuberculosis	128	153	432	473
Anæmia	20	1000	93	53
Infective diseases	269	565	34	38
Gastric and duodenal ulcer	258	92	87	97
Appendicitis	312	597	57	61
Neurasthenia	96	211	145	101

M.=males; F.=females.

It will be noticed that "anæmia" and "neurasthenia" is a less frequent form of incapacity in men than in women; but when the men do give up work for these reasons they take much longer to become fit again. The following figures show the difference in the rate of recovery by the three groups—males, married females, and single females—in various age-groups in the two commonest incapacitating illnesses —influenza and respiratory troubles. The figures give the average duration of incapacity in days.

—	Age			
	under 20.	20–25	25–30	50–55
	INFLUENZA			
Males	13	13	13	18
Married females.. ..	26	21	22	23
Single females	15	16	16	23
	RESPIRATORY DISEASES			
Males	16	15	15	17
Married females.. ..	24	23	28	33
Single females	17	16	19	24

The question arises why a married woman under 20 should take nearly twice as long to recover from influenza as a man or a single girl of the same age. In the respiratory group again the married woman takes much longer to recover and both sets of figures show how the married woman obtains more days' sick pay for her illnesses than the man or the unmarried girl.

The days of incapacity per person are 10·8 in the burghs and 9·6 in the counties, both being higher than last year. Taking individual burgh committee areas, in Dumfries and Maxwelltown it takes the average case 15 days to get well; this is the highest for the Scottish burghs. In Greenock, on the other hand, the average is 7·9 days, this being the lowest. The figure for Edinburgh is 8·4 days. The highest figure for the county committee insurance area is 12·4 days (West Lothian and Zetland). The lowest figure is 6·2 in Perth—exactly a half.

It is estimated that influenza cost the fund £220,000; rheumatism £235,000; and all respiratory diseases, including influenza £515,000. When the money is paid out the age-group which receives the most is that from 20–25—namely £295,000. But this group is larger than any other, containing about 16·3 per cent. of the males and 25·6 of the females. The group 25–30 comes next, receiving £230,000, and the sumsthen gradually fall away until we reach group 50–55, which receives £120,000. It then rises for age-group 55–60, which receives £135,000, up to group 60–65, which gets £225,000.

OBITUARY

SIR JAMES KINGSTON FOWLER, K.C.M.G., K.C.V.O., M.D.

CONSULTING PHYSICIAN TO THE MIDDLESEX AND BROMPTON HOSPITALS

WE regret to announce the death of Sir James Kingston Fowler, consulting physician to the Middlesex Hospital, which occurred on July 3rd at his country house at Beaulieu, Hampshire.

SIR JAMES KINGSTON FOWLER

[*Photograph by Elliott & Fry*

James Kingston Fowler was one of the large family of the late Mr. James Fowler of Woburn. He was born in 1852 and educated at King's College, London, proceeding to King's College Hospital for his medical training. He qualified as M.R.C.S. Eng. in 1874, and held a series of house appointments at his hospital, after which he became house physician to the Addenbrooke's Hospital, Cambridge, entering at the same time Gonville and Caius College as an undergraduate. The post of resident at Addenbrooke's at that time was one of two or three years' duration, and Fowler was admitted to the usual privileges and restrictions of an undergraduate at Caius while living in the hospital. Though rather older than the men of his year, he was a popular member of the college and made many close friends. He graduated in arts and medicine, proceeded to the M.D. degree in 1884, and had in the meantime become M.R.C.P. Lond. In 1886 he was elected F.R.C.P., having been appointed to the staff of Westminster Hospital as pathologist and curator of the museum. This appointment was held for a very short time when he became in the same year assistant physician to the Middlesex Hospital and to the Brompton Hospital for Diseases of the Chest. At both institutions he gained much and deserved credit for his work as clinician, teacher, and lecturer, and the well-known treatise on diseases of the lungs which appeared in 1898, written in collaboration with Rickman Godlee, was a proof of the use to which he had put his opportunities in both places. No doubt the excellent order with which the information in "Diseases of the Lungs" was marshalled, the clearness of arrangement, and the due proportion of space allotted to the different subjects, were assisted by the fact that shortly before its appearance Fowler had edited a "Dictionary of Practical Medicine" by various writers, which met with considerable success, being regularly republished for nearly 30 years. The work of Fowler and Godlee proved an important addition to the literature of scientific and practical medicine, and brought home to readers 40 years ago the lesson—a commonplace to us now—that subjects ought not to rest wholly within the province of either physician or surgeon for their complete exposition. Fowler was the main author, but Godlee collaborated throughout and in special sections; the work, from the moment of its publication, took its place as a standard authority on a subject of high importance.

Fowler's interest in medical education was every whit as influential as in clinical medicine. He was not only a sound and careful teacher, but an experienced examiner, having discharged examining duties in behalf of Cambridge University, the English Conjoint Board, and the War Office. He knew the standards needed in the varying circumstances, and he knew the qualities of varying groups of students. Now in 1900 the University of London was reconstituted with the intention of strengthening the ties between it and the metropolitan institutions engaged in higher education within a radius of 30 miles of the centre. Under the new plan institutions situated within the administrative county, and not carried on for the private profit of owners, could be admitted as schools of the University, with the result that the medical schools of the London teaching hospitals, while preserving their independence, were also recognised as an integral part of the University. The absence of proper facilities for graduation at their University by London medical students was at that time a subject of wide dissatisfaction, and more than one scheme, intended to remedy what was felt to be a hardship, had been put forward previous to the reconstitution of the University. Fowler had been a moving spirit in at any rate one such scheme. And so, with the arrival of the reconstitution of the University, he became prominent in promoting medical graduation among the London schools. As a member of the Senate he was not wholly a success; possibly he knew too much, for although he made his points he gained them slowly and sometimes with difficulty. He was better seen at meetings of a more homogeneous and less formal nature; here his was a valuable voice, and he was both wise and courteous in laying before the permanent staff questions of procedure when they became of a technical character, which was not unusual in the working of the complicated machinery of the University. The value of his services was expressed by his election as dean to the faculty of medicine, a significant compliment to the medical man chosen, for the vote is a testimony of a large electorate to ability and loyalty.

Arising out of his interest in medical education in this country and in the opportunities for the employment of British graduates overseas, Fowler was early brought into contact with the Colonial Office. He served on a departmental committee whose recommendations led to the establishment in 1909 of a Colonial Advisory Medical Committee with himself as one of its first members. The work of this committee, though in kind it was apparently far removed from his other professional activities, became one of the chief interests of Fowler's later life, and he continued to take an active part in it even after his removal from London to Beaulieu. His wise, shrewd, and kindly counsel was greatly valued in the Colonial Office, and his advice influenced in a large way the development of medical services throughout the Colonial Empire. He was indeed deeply concerned to ensure that the medical personnel of the Colonial Service should be adequate in quality for what he conceived to be its great task, and as chairman for many years of a Medical Appointments Board he laboured with this object in view, with results that are now known. His services in this and other capacities in the Colonial Office contributed greatly to the improvement of health conditions in the tropical colonies and towards the enhancement of the prestige of British medicine overseas.

Sir James Kingston Fowler continued to serve until his death as a trustee for the Beit Memorial Fellowships, but his main work was done during the long period of 21 years in which he was also honorary secretary. Both the inception and the successful development of the scheme were due in great part to his influence. During his earlier training as a physician he had worked in several medical schools, and he was therefore able to rise above that intense but narrow loyalty which often makes a man keen to serve his own school but less concerned for the university. When dean of the Medical Faculty of London University he supported strongly the plans for centralising the teaching of preclinical subjects in some large institutes, and for this purpose his medical acquaintanceship with the great South African financiers enabled him to obtain a gift from Mr. Alfred Beit. The proposed institute was never built, and the money was returned after Alfred Beit's death to his brother, Sir Otto Beit. Sir Otto took this nucleus of £50,000, added £165,000 in his own gift, and established in 1909 the Trust for the Beit Fellowships. Fowler, both as original trustee and as secretary of the Advisory Board, was in a central position for guiding the subsequent development of the Trust, and he used his knowledge of men and of practical affairs with a characteristically clear judgment which influenced most happily all that was done. When the Advisory Board met at his house for the selection of Fellows each year, Fowler would deliberately abstain from much comment on the merits of the candidates, for he had taken care that all other members of the Board were Fellows of the Royal Society and he deferred to their judgment in matters of scientific work. "But every now and then," we are told by one who had sat at the Board with him, "he would end a debate by stating some clear-cut principle of which his experience of life had taught him the value—it was an action not unlike the swoop of the hawk, the hunting bird that he admired." The decision to create a senior Fellowship in 1927 for work in tropical medicine reflected Fowler's own interest in that subject since the time when he had been chairman of the Yellow Fever Commission for West Africa. He watched the studies of the Fellow with the most eager sympathy and was deeply disappointed when this promising work had to be stopped owing to the danger of its continuance in London. Not many of his colleagues on the Beit foundation knew him personally, and it was impossible for him, trained as a clinician, to follow their investigations along the intricate ways of the modern sciences ancillary to medicine. Fowler viewed the work of the Trust rather as a whole, and he was proudly conscious that that work was good during all the 21 years in which its guidance lay in his hands.

In 1907 Fowler was president of the Medical Society of London, in 1910 was appointed K.C.V.O., and shortly afterwards he became consulting physician to the Middlesex Hospital and to the Brompton Hospital. On the outbreak of war he was appointed consulting physician to the British Expeditionary Force with the rank of Lieut.-Colonel, and was mentioned in despatches and received the C.M.G. at the termination of hostilities. He was promoted K.C.M.G. in 1932 on his retirement from the Medical Appointments Board of the Colonial Office and in recognition of services rendered as chairman of the Yellow Fever Commission of West Africa.

Apart from the publications already mentioned, Fowler contributed the articles on bronchiectasis and syphilis of the lung to Allbutt and Rolleston's "System of Medicine," wrote a treatise on pulmonary tuberculosis, which appeared in 1921, and in various quarters upon the problems in tuberculosis. After his retirement he issued an interesting history of Beaulieu Abbey, of which he was warden, a post that gave great satisfaction to his deep antiquarian tastes.

BRENNAN DYBALL, M.B. Lond., F.R.C.S. Eng.

SURGEON TO THE ROYAL DEVON AND EXETER HOSPITAL

THE death occurred on June 29th of Mr. Brennan Dyball, an outstanding figure in Exeter and neighbourhood as surgeon and ophthalmologist. He was born in 1872, and received his medical education at St. Thomas's Hospital, where he was Beaney scholar in surgery. He had an outstanding career as a student, for immediately after taking the English double diploma he graduated as M.B. Lond. with honours in medicine and obstetric medicine, while at the examination for the B.S. he obtained the University scholarship. At St. Thomas's Hospital he was house surgeon and assistant demonstrator of practical surgery in the school, and was for a time resident medical attendant to the Hospital for Sick Children in Great Ormond-street. He next became resident surgical officer to the General Infirmary in Leeds. Some 20 years ago he commenced his long association with Exeter by appointment as anæsthetist to the Royal Devon and Exeter Hospital, to which institution he became assistant surgeon in 1912, and later full surgeon. At the same time he was surgeon to the Sidmouth, Exmouth, and Winsford cottage hospital, and held other positions of professional responsibility.

Dyball achieved his fine position through the thoroughness of his work, and his sterling qualities of character. R. A. W. writes of his colleague and friend: "By the death of Brennan Dyball the medical world in Devon has lost a pillar of strength. To those who knew him intimately he was a most engaging personality. His intellectual gifts were exceptional, and being an omnivorous reader there seemed to be no subject upon which Dyball could not illuminate a discussion. He was by nature shy and retiring, and anything savouring of self-advertisement was abhorrent to him. He hated public speaking, and on this account could never be induced even to take the chair at a dinner. Nevertheless he did an immense amount of work on hospital committees, and his insight and judgment were such that most of his colleagues were only too ready to follow his lead. He was absolutely free from pose, had a complete intellectual honesty, and a kindly sense of humour. In all affairs his sincerity and disinterestedness were so obvious that he never seemed to make an enemy, though he was tenacious of purpose. Money appeared to mean little to Dyball. It was far easier to get him to operate than to induce him to collect his fee. He started with some years of general practice, and acquired a clinical judgment out of the ordinary. I have heard it said that he was as good a physician as a surgeon, and as an abdominal surgeon he was in the first rank—at his best, perhaps, in a tight corner. An unexpected condition in the abdomen, at a house far away in the country, lighting not too good and instrumentarium limited—then Dyball was brilliant. Since the war he had interested himself in bone and orthopædic surgery, where a flair for carpentry showed itself in the neatness and ingenuity of his work. He shares with Dame Georgiana Buller the credit for the planning and organising of the Princess Elizabeth Orthopædic Hospital in Exeter, which has inaugurated an extensive service for cripples in Devonshire. There is no doubt that Dyball shortened his life by overwork, notably by the thoroughness with which he carried out a mass of voluntary and unpaid labour. For several years he undertook a large proportion of the operative work at the orthopædic hospital which, in addition to that at the Royal Devon and Exeter Hospital and an extensive private practice, was really too much for one man who worked as conscientiously as Dyball. This tribute is from one who has worked with him for close on 25 years and owes much to his friendship."

Mr. Dyball died at his country cottage in Haytor. He had been operated on three weeks previously, had left the hospital, and appeared to be making a satisfactory recovery in his moorland retreat when the sad end occurred.

JOHN FREDERICK JENNINGS, M.B., B.S. Lond., F.R.C.S. Eng.

WE regret to announce the death, at his house in John-street, Mayfair, London, of Dr. John Frederick Jennings, one of the best known general practitioners in the district.

Born at Cardiff in 1875, the son of Mr. T. M. Jennings, J.P., a shipowner, Jennings was educated privately with the intention of entering his father's business. But deciding on a medical career he went for his medical training to St. Bartholomew's Hospital. Here he was a successful student, obtained the English double qualification in 1900, and took the degree of M.B. Lond. in 1901. Two years later he took, with honours, the degree of B.S., and at the same time he acquired the F.R.C.S. Eng. At St. Bartholomew's hospital he held a series of posts, being house surgeon, midwifery interne, and clinical assistant in the throat department, and for a time his intention to enter consulting ranks was suggested by his appointment as demonstrator of pathology in the hospital medical school. Here, as in his previous posts, he was quite successful, but he eventually turned to general practice and, apart from the war period, worked in Mayfair for 30 years, that is from 1904 onwards. During the war he was consulting physician to the Swedish War Hospital and also acted as surgeon specialist to the Queen Alexandra Military Hospital, Millbank.

A personal friend writes of him as follows:—"Jennings, known to a wide circle of friends as 'Fred,' was an extremely popular man as well as capable physician. He had the confidence of his numerous patients and deserved it, so alert was his intelligence; his reputation gained with his experience of 30 years, and while rarely at a loss over a case his own great equipment helped him to see when he needed other counsel. Then his range of personal friendship in the profession enabled him to get into touch with right opinions when further advice was needed. All those who knew him felt that he might have achieved high honour in specialist ranks, but they could see that in his preference for general practice he had found the right field for his talents. His deep, reassuring voice, his unfailing good humour, his gifts as a raconteur, and his obvious enjoyment of London life, were of value to him and his patients in the daily round—they helped to complete their trust and confidence. A regular visitor to Covent Garden and an enthusiastic golfer, usually at Walton Heath, he added in both places to a vast list of friends and acquaintances. He will be much missed in the sick-room, in the club house, and at the dinner-table; his big personality has left its mark."

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 30TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 1 (last week 2); scarlet fever, 2289; diphtheria, 1115; enteric fever, 20; acute pneumonia (primary or influenzal), 676; puerperal fever, 30; puerperal pyrexia, 79; cerebro-spinal fever, 31; acute poliomyelitis, 6; acute polio-encephalitis, 2; encephalitis lethargica, 15; dysentery, 6; ophthalmia neonatorum, 102. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 9th–10th was as follows: Small-pox, 1 under treatment, 0 under observation (last week 3 and 1 respectively); scarlet fever, 1593; diphtheria, 1594; measles, 1224 (last week 1331); whooping-cough, 293; puerperal fever, 26 mothers (plus 9 babies); encephalitis lethargica, 268; poliomyelitis, 2; "other diseases," 201. At St. Margaret's Hospital there were 11 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there were no deaths from small-pox, 2 (0) from enteric fever, 23 (7) from measles, 3 (1) from scarlet fever, 25 (5) from whooping-cough, 50 (8) from diphtheria, 47 (13) from diarrhœa and enteritis under two years, and 21 (1) from influenza. The figures in parentheses are those for London itself.

Of the deaths from measles 3 were in Stoke-on-Trent; Oldham and Bristol each reported 3 from whooping-cough. Diphtheria caused 6 deaths in Liverpool, 4 each in Manchester and Warrington, and 3 in Leeds. Of the deaths from diarrhœa and enteritis under 2 years, 6 were in Birmingham and 5 in Manchester.

The number of stillbirths notified during the week was 321 (corresponding to a rate of 47 per 1000 total births), including 41 in London.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Public Health Services

ON July 3rd the House of Commons went into Committee of Supply on the Civil Estimates, 1934. Captain BOURNE (Deputy Chairman of Committees) was in the chair.

The debate was resumed on a Vote of £13,639,924 for the salaries and expenses of the Ministry of Health.

Mr. RHYS DAVIES moved to reduce the vote by £100. He said that all over the country the medical profession were doing excellent work in the conquest of disease, but the Minister of Health did not make any reference to cancer, rheumatism, or nervous disorder. With reference to national health insurance it was perhaps known to hon. Members that within the scheme there was a regional medical staff, and also a Dental Benefit Council. He understood that the Ministry of Health was working on a scheme to provide that the insured population should also receive their rights in connexion with optical benefit. He would be glad if the Minister could say something about the new Optical Council which he believed was about to be formed to see that optical benefit was properly administered. He also asked the policy of the Ministry in relation to the provision of more maternity homes. There had been a regrettable reduction of £500 in the provision for the training of midwives and health visitors, which was £26,500 in 1934. He asked whether a successor was to be appointed to Dame Janet Campbell, who had done excellent service for the health of the community, and if so when the new appointment would be made, and whether the circular to local authorities pointing out the directions in which the development of their services were still required, particularly in areas where the rate of maternal mortality was highest, had yet been issued?

Mr. PICKERING said that even if the slum clearance problem was proceeded with at the rate anticipated by the Minister of Health, and some 200,000 slum dwellings were cleared away and replaced by a corresponding number of good houses in the next five years, nevertheless the actual housing problem would not have been advanced any further because there would still remain an enormous shortage of "C" class dwellings which the poorest paid workers could rent at figures which they could afford to pay.

Mr. WEST said he shared the optimism of the Minister in regard to the great improvement in the health of the country, but there were still many black spots to be found in England, and he referred particularly to such places as North Kensington, where the infantile death-rate was nearly three times as high as that in South Kensington.

Sir FRANCIS FREMANTLE said that those who were concerned in the study of cancer were generally of the opinion, though they were not unanimous—that would not become the medical profession—that there was no real increase, age for age, and like for like, in the incidence of cancer at the present time. It was quite clear that there was a change going on in the age-distribution of the population. A greater proportion of old people in the population meant that diseases of old age became more prominent per 1000 of the population. Cancer being a disease of those between 40 and 70, it had a larger prey, and the figures were increasing; but as far as they could make out from the figures in any one area under like circumstances the total affected between 40 and 70 was fairly stationary. But the outlook was hopeful, mainly because of the encouragement being given to research.

The same thing applied to a certain extent to the increase of rheumatism. The incidence of nervous disease and mental deficiency had in the past been marked by the fact that such disorders were regarded as having a stigma attached, and had been concealed. But when they got down to the problem and found that there was some reasonable prospect of treatment for nervous disorders, they were able by ascertainment to increase the apparent incidence of these disorders.

One of the most important subjects was infant mortality. There had been a constant decrease in the figures of mortality, from 153 per thousand 73 years ago to 62 per thousand last year. Comparing the infant mortality at the beginning of the century with that to-day, the Minister had saved something like 40,000 lives in the year. This drop in infant mortality applied not only to infancy but continued through the second, third, fourth, and fifth years of childhood. It was the present principal medical officer of the Ministry of Health who first drew the attention of medical officers generally to the fact that there was this blank in the public health. Whereas 35 per 1000 died in their second year before the war, the figure had now been reduced to 14; in the third year it had fallen from 14 to 6 per 1000; in the fourth year from 9 to 4 per 1000; and in the fifth year from 6 to 3 per 1000. It was remarkable how much the ordinary mother was learning to-day, and that result had been achieved largely through the activity of health visitors.

Maternal mortality was a pressing and difficult problem. In 1912 there were 3492 maternal deaths, which in 1932 had been reduced to 2587, but the rate per 1000 births had not gone down. It was under 4 before the war, and it was now nearly 4½. Those in touch with the work of midwives and district nurses in rural areas could not fail to be struck with the contrast between the general rate and the rate among those cases which were conducted by the midwives. In the last two centuries in this country we had rather departed from the system which still existed in many other countries, under which confinements were primarily the work of the midwife and not of the doctor. He hoped they were coming back to the system in this country, and that they would be able to get a body of properly trained midwives to conduct midwifery work, leaving the medical profession to be brought in for consultative purposes, or in the case of need, for the support and instruction of the midwife. But if that was to be the case the midwives would require to be trained for the purpose. More attention would have to be paid both to their original training and to their post-graduate training than was the case at present. Whereas the rate for the whole country was 4½ per 1000 births, in the cases dealt with by the Queen's Institute of District Nursing for the same year the rate was 2·1. There were several reasons for the difference. One was that mothers who were having their first confinement did not take risks and very often went into hospital, while complicated cases were not treated by the midwives. These cases got into the hands of the doctors sooner or later and therefore the figures did not afford a fair comparison as to the efficiency of one method or the other. But the fact remained that there was this comparatively low rate among the cases dealt with by the district midwives as compared with the figures for the whole country. There was, however, a slight increase also in their figures. One of the difficulties among mothers to-day was a question of diet; another was the shape of the pelvis. According to the departmental report on maternal mortality the shape was more adapted to easy childbirth in Dutch than in British women. He believed that training and exercises in early life might lead to improvement in that direction. Many cases—over one-third, he thought—were traced to puerperal infection, which often arose through the use of instruments in a hurry, and the desire to hasten the natural process.

Sir FRANCIS further asked whether the Mental Treatment Act, 1930, had not had the effect which was hoped for in encouraging patients to submit themselves voluntarily for treatment at a mental hospital. He was inclined to think there was too much officialdom. They could get voluntary treatment in incipient mental disease only by making it as easy and unofficial as possible. He also asked whether the Registration of Nursing Homes Act, 1927, had improved the working of those homes, and had led to the closing of unsatisfactory homes? Had it stopped undue profiteering and prevented fraud?

They saw the figures for tuberculosis with heavy minds after all the money that had been spent. In 1932 tuberculosis patients who died or were discharged from approved residential institutions numbered 39,000. Of these 500 died in institutions, nearly 9000 were discharged quiescent, and 24,000 were discharged not quiescent. The 24,000 discharged not quiescent went back to their homes, which were very likely overcrowded and in the slums, and they were spreading the disease among other people. After two, three, or five years they died, and all the work which had been put into sanatorium and dispensary work was wasted. Places such as Preston Hall in Kent or Papworth in Cambridgeshire gave much hope and encouragement, but were limited to a very small number. Could not some of the money which was to be devoted to slum clearance and rehousing be used for rehousing in village settlements like Papworth? He could not help thinking that by some coöperation between the Unemployment Board and the Ministry of Health there might be some hope of giving employment in training centres to unemployed people who were tuberculous.

Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health), replying to the debate, said that in regard to the drought and the urban water-supply the Ministry on the whole were looking forward with confidence to the future, always provided that the consumers could be relied upon to coöperate in reasonable economies. The Rural Water Supplies Act was helping to solve the permanent problem in the rural areas. In the two and a half months since the Act was passed they had had applications from 593 parishes in respect of capital works totalling £1,700,000. They had approved for grant water schemes in respect of 211 parishes amounting to a total capital of £700,000. That was twice the total of the last two years, and it was approaching the maximum figure ever reached under the predecessors of the present Minister of Health. He claimed that at that rate the permanent problem of water-supplies in rural areas would be very greatly alleviated. In view of an alarming article in the press alleging that there was an outbreak of scarlet fever and diphtheria, and that these diseases were everywhere increasing, he had sent for the best expert in the country. He had pointed out that scarlet fever and diphtheria were not diseases that were connected with absence of water, but that on the contrary those diseases came in cycles of four years or five years and that more often than not they occurred in areas where the water-supply was satisfactory. To sum up the water situation, he could say that by legislation, by administrative action, inspection, and conference they had been able to render great assistance to local authorities in the matter of the drought. Very much of what Mr. West had said about overcrowding causing disease and infant mortality could not be denied, and for that reason the Government were bringing in a Bill which particularly would apply to those troublesome aspects of the problem. The Minister of Health in his slum clearance crusade was in the next five years putting at the disposal of local authorities for finding accommodation for the poorer paid workers 300,000 houses at a cheaper rent than anything which had been hitherto provided, and in connexion with the new overcrowding Bill that policy would be continued and the local authorities under subsidy where necessary would cater for the poorer paid workers. The machinery of slum clearance had started working and was gaining pace. At the end of the year he hoped they would be able to improve even on the present figures.

Wing-Commander JAMES said he regretted that in view of the unanimous report of the Departmental Committee on Sterilisation of Mental Defectives the Government had not found it possible to implement that report or to hold out any immediate prospect that they were going to do so. He would like to ask what steps were being taken to carry out the recommendations in respect of research that were made in Chapter 7 of the report.

Dr. O'DONOVAN said that surely it was selfishness to want to raise their own standard of living by mutilating the bodily integrity of those who were admittedly their weaker brothers. People classed as mental defectives belonged to a class which the medical profession found the utmost difficulty in labelling. In the medical press there were many articles pointing out that many so-called mental defectives were in fact dullards. Any breach of the affection and trust which existed between patient and doctor would be to the greatest disadvantage to the calling of medicine. Another difficulty would arise in public life and in hospitals if administrators insisted on sterilisation as being good for the State, while doctors and nurses for professional and conscientious reasons differed from such conclusions.

After further debate,

Sir HILTON YOUNG (Minister of Health) said that with the assistance of the approved societies and his advisers he had constantly sought for means of relieving the position in regard to arrears under National Health Insurance. They had taken measure after measure for that relief, and it had been very effective. In order to simplify the matter and to assist the position of those who were now falling into arrears they had now succeeded in arranging that the reduction of arrears of contributions from 1*s.* 6*d.* to 9*d.* should apply to all those who, owing to unemployment, were falling into arrears. That was a very big concession indeed, and one which they were told by the approved societies would make a very great alleviation of the situation for the unemployed. In regard to maternal mortality, it was the intention of the Ministry to press ahead with the development of the service for the sake of mother and child. They would not be content until these services in every part of the country were as good as they were in the best equipped towns. He proposed at the proper time to renew the measures for stimulating efforts of this sort by a direct message to local authorities. If the methods they were adopting did not succeed they must proceed to others.

The motion to reduce the vote was rejected by 173 votes to 39.

Scottish Poor-law

In the House of Commons on July 5th the Poor Law (Scotland) Bill as amended in Standing Committee was considered.

The measure was recommitted in order that several amendments might be discussed which could not be discussed on the Report stage.

Mr. BUCHANAN moved an amendment to Clause 11 (Outdoor relief to members of friendly societies, &c.) to ensure that in affording outdoor relief to any person a local authority should disregard the first 5*s.* of his sick pay from a trade union, as well as from a friendly society.

Mr. SKELTON (Under-Secretary for Scotland) accepted the amendment, which was agreed to.

Mr. N. MACLEAN moved the first of three amendments to ensure that the local authority in assessing or allocating relief should disregard maternity benefit, any weekly payment by way of compensation under the enactment relating to workmen's compensation, and any pension under the Blind Persons Act 1920, and any other income by virtue of the provisions of that Act or from any charity for the blind.

After some debate,

Mr. SKELTON said that this was a case where he could not give a concession. In Scotland all the local authorities except two had special schemes whereby assistance to destitute blind was not given by way of public assistance but under the Blind Persons Pensions Act. He proposed to take the matter up ith the two authorities to whom he had referred, nd ask them to come into line with the rest of otland. The Government were not prepared to move from local authorities the discretion to disgard half the amount of workmen's compensation n applicant received. With regard to maternity enefit his information was that it was generally isregarded.

At a later stage,

Mr. SKELTON announced that having been impressed with the debate he would accept the amendment in espect of maternity benefit, but on the distinct understanding that it should be redrafted when the Bill reached the House of Lords.

The amendment was agreed to.

Mr. MACLEAN then formally moved the amendment relating to payments by way of compensation, this being negatived by 183 votes to 48.

The amendment dealing with pensions under the Blind Persons Act 1920 or from any charity for the blind, also formally moved, was negatived by 190 votes to 34.

The Bill passed through the report stage and was read the third time by 143 votes to 29.

Road Traffic Bill

In the House of Lords on July 10th the Road Traffic Bill (which has passed through the House of Commons) was read a second time.

HOUSE OF COMMONS

WEDNESDAY, JULY 4TH

Safety Glass in Public Service Vehicles

Mr. HOLFORD KNIGHT asked the Minister of Transport whether, in the interests of public safety, he would make it compulsory for all public vehicles to be equipped throughout with safety glass.—Mr. HORE-BELISHA replied: Since Jan. 1st, 1932, the regulations have required, as regards new vehicles, that all glass fitted to windscreens or windows facing to the front on the outside of any motor vehicle, except glass fitted to the upper deck of a double-decked vehicle, shall be safety glass. As at present advised, I do not think it necessary to make the use of such glass throughout public service vehicles compulsory.

Replying to a further question by Mr. Knight, Mr. Hore-Belisha said that he would be ready to give further consideration to any suggestion.

Air Attack with Disease Germs

Sir NICHOLAS GRATTAN-DOYLE asked the Prime Minister whether he was aware that evidence existed that experiments were being made and secret German plans perfected by the Luft-gas-angriff department for the destruction of human beings in war by aircraft carrying deadly disease germs; that experiments had been made concerning the vulnerability of underground railways in London and Paris; whether he had considered the evidence; and what action, if any, he proposed to take.—Mr. BALDWIN replied: I have seen allegations to this effect in a published article. They have been officially denied by the German Government. The question of the vulnerability of the underground railways in London is kept under constant observation as part of the general question of air raids precautions, but I do not consider it in the public interest to make any further statement.

THURSDAY, JULY 5TH

Coroners' Jurisdiction and Disposal of Bodies

Mr. LAWSON asked the Home Secretary whether he was aware that considerable distress was caused to relatives of persons fatally injured just within the boundaries of one coroner's jurisdiction while their homes were in another; that the bodies sometimes lay for two or three days in the mortuary before being conveyed to the homes of relatives; and whether he could take steps to avoid the unnecessary pain arising from this practice.—Sir JOHN GILMOUR replied: Section 14 of the Coroners Amendment Act of 1926 empowers a coroner to issue a burial order at any time after he has viewed the body, and I have no doubt that coroners generally are ready to avail themselves of this power in proper cases.

Mr. LAWSON: In view of the very bad case that I brought to the right hon. gentleman's attention where a man's body was brought from the pit to Gateshead, just over the border, and then was taken away by a policeman, cannot the right hon. gentleman do something to modify the position in cases where there are two areas of jurisdiction?

Sir J. GILMOUR: I understand that in the case referred to the body was removed before the coroner had an opportunity of going into the matter. It is essential that the coroner should give an order.

Mr. LAWSON: Is the Home Secretary not aware that the bodies are removed immediately from the pit to their homes, but in this case it was simply a case of the coroner's fees, I understand?

Sir J. GILMOUR: I am very anxious, of course, to obviate any kind of unpleasantness in dealing with this problem, but it is essential from the point of view of the coroner that the removal of the body should not take place before he gives the order.

Captain HAROLD BALFOUR: In view of the unsatisfactory nature of this particular case, and the general unsatisfactory working in the case of fatal injuries and seriously injured persons on the roads, would my right hon. friend consider setting up a departmental committee in order to find out how far overlapping exists, and to try to straighten out the present unsatisfactory condition of things?

Sir J. GILMOUR: I am prepared to consider the whole matter. I cannot commit myself to what action I shall take.

State Medical Service

Mr. LLEWELLYN-JONES asked the Minister of Health whether he was aware of the movement both in the medical profession and also amongst friendly societies and national health insurance organisations in support of the setting up of a complete medical service for the whole of the population of the country; and whether he would favourably consider the appointment either of a parliamentary or of a departmental committee to explore the situation and to report as to the desirability of introducing legislation for the creation of such a service.—Sir HILTON YOUNG replied: Proposals on this subject have been brought to my notice and are being examined, but I am not at present in a position to indicate what action, if any, the Government may decide to take in relation to them.

Imports of Processed Milks

Sir PERCY HURD asked the Minister of Agriculture what arrangements had been made for the regulation of imports of processed milks after June 30th.—Mr. ELLIOT replied: The Governments of the foreign countries mainly concerned in the United Kingdom market for condensed milk, milk powder, and cream have been asked to arrange for the following reductions in supplies as from July 1st, the reductions in each case being based on imports during the corresponding months of the year previous to the introduction of the voluntary import regulation arrangements—namely, June, 1932–May, 1933:—

Condensed Skimmed Milk.—Continuance for the time being of the reduction of 22½ per cent.

Condensed Whole Milk and Milk Powder.—Continuance for the time being of the reduction of 20 per cent.

Cream.—Reduction of 33⅓ per cent. for the quarter ending Sept. 30th.

The Governments of the Commonwealth of Australia and of the Dominions of Canada and New Zealand have been asked to continue during the quarter ending Sept. 30th the coöperation which they have been good enough to afford since the regulation of imports of processed milks was first introduced. Arrangements are also being made to secure reductions in imports of condensed whole and skimmed milk and cream from the Irish Free State. It will be appreciated that, since the bulk of our imports of processed milks, other than cream, from foreign countries is supplied by the Netherlands, the position as regards import regulation is for the time being governed by the agreement recently concluded for the maintenance of the status quo in trade relations between the United

Kingdom and the Netherlands, pending the negotiations of a trade agreement.

Rehousing and Slum Clearance

Mr. Chorlton asked the Minister of Health if he was now able to announce the names of the members he had appointed to deal with the question of buildings involved in rehousing after slum clearance.—Mr. Shakespeare, Parliamentary Secretary to the Ministry of Health, replied: The members of the committee will be:—Mr. Ewart S. Andrews, B.Sc., M.Inst.C.E., M.I.Struct.E.; Mr. Henry V. Ashley, F.R.I.B.A.; Mr. Oscar Faber, O.B.E., D.Sc., M.Inst.C.E., M.I.Struct.E.; Mr. George Topham Forrest, F.R.I.B.A.; Mr. Ian B. M. Hamilton, B.A., A.R.I.B.A.; Sir George W. Humphreys, M.Inst.C.E.; Mr. B. L. Hurst, M.Inst.C.E., M.I.Mech.E.; Mr. L. H. Keay, O.B.E., F.R.I.B.A.; Mr. Francis Lorne, F.R.I.B.A.; Mr. J. A. Macintyre, O.B.E., B.Sc., M.Inst. C.E.; Mr. R. Travers Morgan, M.Eng., M.Inst.C.E., A.M.I.Mech.E., M.I.Struct.E.; Mr. Stanley C. Ramsey, F.R.I.B.A.; Mr. A. Scott, M.B.E., F.R.I.B.A., M.I.Struct.E.; Mr. W. L. Scott, M.Inst.C.E.; Mr. R. E. Stradling, M.C., D.Sc., Ph.D., M.Inst.C.E.; and Mr. J. Wilson, F.R.I.B.A., F.R.S.E. Sir George Humphreys will be chairman, and Mr. A. Zaiman, whose services have been lent by the Department of Scientific and Industrial Research, will be secretary of the committee.

Medical Practitioners and Motor Accidents

Mr. Temple Morris asked the Minister of Transport whether, in view of the proposed mulcting of a motorist of 12*s.* 6*d.* for the fee of a doctor when his car had been in collision with anyone, he could state whether the doctor in each case would be summoned by the parties to the accident or by the police, or whether it was intended that any individual should have the right to communicate with a medical man.—Captain A. Hudson, Lord of the Treasury, replied: The circumstances of accidents vary greatly, and a hard-and-fast rule as to who has the right to summon medical assistance would be likely to involve dangerous delays.

Medical Research

Sir Robert Gower asked the Secretary to the Treasury what sum had been devoted by the State this year to the promotion of medical research and what sum had been similarly applied during the last eight years.—Mr. Duff Cooper replied: The annual grant in aid of the Medical Research Council was £135,000 from 1925 to 1927 inclusive, £140,000 from 1928 to 1931 inclusive, and £139,000 in 1932 and 1933. Provision for a grant of £139,000 is included in the estimates for the current financial year. There are other contributions made by the State to medical research, but, apart from a grant of £100,000 in 1929 for the purchase of radium, it is not possible to give figures. Inclusive grants are paid to a number of universities out of which considerable sums are allocated by the University authorities to their medical schools, which include medical research among their activities, but it is not possible to distinguish the amounts applied to this purpose. In addition, medical researches are undertaken from time to time by the Ministry of Health and other Government departments.

Silicosis in South Wales

Dr. John Williams asked the Secretary for Mines the number of men certified for silicosis in the county of Carmarthen and in the rest of the South Wales coalfield; and the number of such cases where death had resulted from this disease.—Mr. Ernest Brown: I am informed by the Home Office that between June 1st, 1931, when the Medical Board under the compensation scheme was appointed, and May 31st, 1934, 105 miners were certified by the Board as disabled from silicosis in the county of Carmarthen and 279 in the remainder of the South Wales coalfield; and that the number of deaths certified by the Board were 26 and 57 respectively.

MEDICAL NEWS

Royal College of Surgeons of England

Election to the Council.—On July 5th four Fellows were elected into the council to fill the vacancies occasioned by the retirement in rotation of Mr. Ernest W. Hey Groves, Mr. G. Grey Turner, and Mr. Hugh Lett, and by the death of Mr. R. P. Rowlands. The result of the poll was as follows:—

	Votes.	Plumpers.
George Grey Turner (Newcastle) ..	903	6
Ernest William Hey Groves (Bristol)	841	3
Hugh Lett (London)	734	43
William Girling Ball (St. Bart.'s) ..	584	61
Ernest Cranmer Hughes	445	27
Alfred William Sheen	298	6
Duncan Campbell Lloyd Fitzwilliams	240	10
Gwynne Evan Owen Williams ..	210	13

In all 1995 Fellows voted, including 210 Fellows resident out of Great Britain and Ireland; in addition, 9 votes were found to be invalid, and 2 were received too late. Mr. Girling Ball becomes substitute member of council for the late Mr. Rowlands until 1938.

University of Oxford

The Theodore Williams Scholarship in Anatomy is to be divided between D. L. P. de Courcy and L. L. Whytehead; the Theodore Williams Scholarship in Pathology has been given to D. F. G. Moir. The master and fellows of University College have awarded the Radcliffe Scholarship in Pharmacology to H. M. Sinclair.

University of Leeds

On July 3rd the honorary degree of D.Sc. was conferred on Dr. Joseph S. Bolton, medical director of the West Riding Mental Hospital, and until recently professor of mental diseases at Leeds University, and Sir Robert Muir, F.R.S., professor of pathology in the University of Glasgow.

University of London

At a meeting of the court held on July 4th tenders from seven selected firms for the superstructure of the first of the buildings to be erected on the University's site in Bloomsbury were considered. The lowest tender received—namely, that of £362,579—was accepted. A condition of the contract will be the use throughout of materials obtained from sources within the British Empire. The contract will provide for the building of the senate house and administrative offices, a portion of the University library, and certain works connected with the hall.

The Kent county council has made a grant of £40,000, payable over ten years, towards the cost of the new University buildings.

University of Manchester

At recent examinations the following candidates were successful:—

M.D.

C. N. Aldred, Marguerite E. Cliffe, Benjamin Dunkerley, E. A. Gerrard (with commendation), E. R. W. Gilmore, J. M. Greenwood, E. F. Hill (gold medal), Geoffrey Lapage, W. H. Newton (with commendation), Gerald Ramage, and B. R. Sandiford.

CH.M.

W. B. McKelvie.

FINAL EXAMINATION FOR M.B. AND CH.B.

D. H. Mackay (second-class honours), Harry Baker, Monica D. Boyle, A. S. Bullough, W. P. Cargill, Neville Copeland, J. D. H. Cran, D. D. Cranna, Annie M. Dawson, I. H. Flack, Norman Goldstone, Harry Harris, Eileen M. Hughes, Fred Janus, N. F. Kirkman, Amy B. de V. Mather, G. H. Moore, E. L. Patterson, Ralph Spencer, and J. A. A. L. Woodhead.

Part I.—Monica D. Boyle, John Charnley, Eleanor B. Clarke, Mary A. C. Cowell, T. F. Davey, F. P. Ellis, William Fielding, F. I. Firth, Samuel Franks, Eric Greenhalgh, G. D. Harthan, E. H. Heilpern, K. H. Higson, A. D. Hoffmann, L. L. Husdan, J. I. A. Jamieson, W. E. Kershaw, A. F. Mackay, Ralph Mallinson, J. L. Morgan, Annie [illegible] R. L. Parish, C. S. Parker, J. N. Parker, G. R. [illegible] t Ross, Cyril Royle, H. L. Settle, J. N. [illegible] ute, Roland Thornley, H. J. Wade, J. R. [illegible] I. Williams.

iversity of Manchester

Dr. C. P. Lapage, lecturer in diseases of children, has n appointed to a university readership. Dr. J. F. slop and Dr. Eric Vernon have been appointed demonators in anatomy.

iversity of Edinburgh

On June 28th the degree of D.Sc. was conferred on . S. A. Kinnier Wilson.

iversity of Dublin

Dr. William Robert Fearon, Fellow of Trinity College, ublin, and hitherto lecturer in biochemistry in the iversity, has been appointed professor of biochemistry. . David Smyth Torrens, hitherto lecturer in histology, comes assistant professor of physiology.

niversity of Aberdeen

On July 9th the following degrees were conferred :—

M.D.

***T. N. Morgan, ***Ann L. Thomson, **Alexander Cruickank, **J. R. M. Mackie, *A. G. Badenoch, *Roderick Mackay, dward Farquharson, T. A. Fraser, W. H. Harris, A. W. enderson, Catherine I. A. Jamieson-Craig, and Mary Riddoch.

*** With highest honours; ** with honours; * with comiendation.

M.B., CH.B.

C. Ludwig (with second-class honours); E. P. Adel, . J. Beddie, Hugh Burnett, J. R. Byars, John Cameron, dward Cay, E. M. Darnley, I. K. Ettman, Jane R. Forgie, harles Glassman, J. F. R. Goodlad, J. T. Grassie, David Horn, . R. Horn, R. A. Horne, P. W. Ingram, M. H. Kirsner, A. H. asdon, L. A. Ledingham, A. P. Macdonald, J. C. McGregor, . A. M. MacLennan, J. H. S. Morgan, A. F. T. Ord, Gilbert arker, J. R. M. Sangster, I. M. Schnee, J. A. Shearer, Isadore hechner, S. R. N. Smith, E. J. Strachan, J. W. M. Sutherland, nd A. H. Weiner.

D.P.H.

A. G. Badenoch, Douglas Bell, Alexandra H. Duthie, and J. B. Ewen.

Jniversity of Birmingham

Dr. P. C. P. Cloake, honorary physician to the Queen's Hospital and to the Birmingham and Midland Hospital or Nervous Diseases, Birmingham, has been appointed professor of medicine in the university in succession to Prof. J. G. Emanuel.

Dr. Cloake qualified in 1915 afterwards serving in the Royal Army Medical Corps. In 1921 he graduated M.B. in the University of London and in 1923 obtained the university medal for his M.D. thesis. In 1924 he became a member of the Royal College of Physicians of London, and he has also obtained diplomas in public health and psychological medicine. Dr. Cloake served on the staff of the Ministry of National Service and Ministry of Pensions in Cambridge and in 1920 became deputy commissioner of medical services. During this time he acted as lecturer at Cambridge University and as honorary physician to the psychological department of Addenbrooke's Hospital. He returned to London on his appointment as registrar to the Hospital for Nervous Diseases at Maida Vale and became an assistant physician to the Metropolitan Hospital. In March, 1925, he went to Birmingham as assistant physician to the Queen's Hospital. He has held a research grant for work on organic nervous diseases in London [illegible] the author of one of the special reports of [illegible] Board. His other contributions to me[illegible] discussions of the mental sequelæ of [illegible] and the influence of the diencephalon on metabolism.

Applications are invited for the appointment of reader in industrial hygiene and medicine, and should reach the secretary of the University not later than Sept. 1st. The decision of the University to establish a new department for teaching and research in this subject was reported in our issue of April 28th (p. 927). Particulars of the appointment are given in our advertisement columns this week.

West London Medico-Chirurgical Society

On July 4th the president and Mrs. H. Tyrrell-Gray received the guests at the society's fifty-second annual dinner, held at the Trocadero Restaurant. As soon as everyone was seated, Sir Alfred Rice-Oxley rose to present a loving cup and chain purchased for the society with a legacy from Dr. Rickard Lloyd, a member of long standing who died early last year. The cup shows the names of 52 presidents, including Sir Alfred, and the chain embodies the badge of the society, presented by Charles Keetley. After dinner Lord Macmillan proposed the toast of president and society. Speaking of the value of professional gathering, he quoted the saying that "a rut differs from the grave in being a little narrower." Doctors were fortunate in their profession, for the term "beloved physician" had an almost canonical flavour; but who had ever heard of a "beloved solicitor"? After referring to his unmeasured admiration for the work done, especially in hospitals, by medical men, and particularly of Mr. Tyrrell-Gray's services at Great Ormond-street, Lord Macmillan concluded with an appeal for medical support for the University of London. In response, Mr. Tyrrell-Gray spoke very modestly of his own achievements and very warmly of his guests and fellow officers. Dr. F. J. McCann, in proposing the guests, described how Lord Macmillan, an LL.D. of seven universities, had served as chairman of the Royal Commission on Lunacy and then had been appointed to preside over the Pharmacopœia Commission. Sir Stanley Jackson, as Governor of Bengal, had proved his ability to stand up to bullets as well as bowling, and as chairman of the Test selection committee had brought good fortune to this country. Sir Stanley remarked that he found the compliments refreshing, for bouquets were by no means thick upon the ground. Mr. Warren Low, president of the Royal Society of Medicine, said that his society had now more than 5000 fellows and 170,000 books in its library. But size was not everything. He recalled a conversation between a bishop and a shepherd who said he had 500 sheep. "Ah," said the bishop, "I too am a shepherd but count my flock in tens of thousands." "Mon," said the shepherd, "that must be an awful responsibility in the lambing season."

Association of Surgeons of Great Britain & Ireland

A surgical scholarship of the value of £350 will be awarded in November by the association to a candidate who wishes to pursue a definite line of research or to study surgery in specified clinics either at home or abroad. Further particulars will be found in our advertisement columns. The honorary secretary of the association is Mr. Julian Taylor, 65, Portland-place, London, W. 1.

British Social Hygiene Council

This council, acting with the Conference of British Missionary Societies, has organised a conference on official and non-official coöperative action in combating traffic in women as suggested by the League of Nations inquiry in the East. The conference will be held in the London School of Hygiene and Tropical Medicine, Keppel-street, W.C., on Wednesday, July 25th. Lord Lytton, the chairman, will open the morning session at 10 A.M.

North Devon Isolation Hospital

A joint isolation hospital, serving nine contributory authorities, all in North Devon, has been opened. The building, which has cost £17,000, has accommodation for 30 patients.

Naval Sick Berth Staff

At a meeting recently held under the presidency of Surgeon Vice-Admiral Sir Reginald Bond, a central council of the Royal Naval Sick Berth Staff Associations at Portsmouth, Plymouth and Chatham was formed under the patronage of Admiral of the Fleet, Sir Roger Keyes. These associations seek to provide death and invaliding benefits for the sick berth staff, and to assist them in obtaining employment on discharge from the Service. Each will still manage its own financial affairs, but with the assistance of a central council it is considered that the employment question will be more forcibly brought to the notice of the medical and general public. The royal naval sick berth staff are trained men who act as nurses in the royal naval hospitals, and on ships in the Navy. They have to pass examinations for promotion, and are discharged to pension after 22 years' service. They have considerable experience in responsible positions. Many have qualified as masseurs, radiographic, laboratory, electro-therapeutic, and operating theatre assistants. All have experience in dispensing, and store-keeping, as well as surgical, medical and mental nursing, and are said to be qualified to fill various situations in hospitals, clinics, institutions as surgical assistants, or as assistants to medical men. Surgeon Vice-Admiral R. W. B. Hall, medical director-general, is a vice patron, while Sir Reginald Bond is the president of the council. Surgeon-Captain Montague Knapp, c/o Medical Department, Admiralty, London, S.W. 1, is the representative president who will be glad to furnish any further information.

There will be a meeting at the Mansion House, London, under the presidency of the Lord Mayor, on Wednesday, July 18th, at 4 P.M., when the Duchess of Atholl and Sir John Martin Harvey will speak on behalf of the Robert Jones National Memorial. The Lord Mayor will be supported by Mr. Rudyard Kipling and Lord Moynihan.

The American Association for the Study of Goitre has awarded to Mrs. M. A. B. Brazier, Ph.D., B.Sc., the Van Meter prize of $300 for the essay entitled the Impedance Angle Test for Thyrotoxicosis. A leading article on the Measuring of Thyroid Dysfunction, using Mrs. Brazier's method as a text, will be found in THE LANCET of Sept. 30th, 1933, where her work was first published. A later paper by Dr. Brazier and Dr. F. M Grant appeared in our issue of Jan. 20th of this year.

Morland Clinics, Alton

On July 7th, at a garden fete held at Morland Hall in aid of the Morland Hall cot fund at the Treloar Cripples' Hospital, Lady Radnor opened the new west wing of the clinics. It will be possible in the new wing to give natural sun treatment to the patients in their own rooms without the necessity of wheeling them onto the adjacent balcony. The Morland Hall cot is maintained by contributions of patients at the clinics and their friends.

Order of St. John of Jerusalem

The following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem have been sanctioned by the King :—

As Knight of Justice.—Lord Moynihan and Dr. A. M. Ware.

As Knight of Grace.—Hon. J. H. King, M.D., Colonel H. A. Bruce, F.R.C.S., and Sir Frederick Norton Kay Menzies M.D.

As Commander.—Capt. R. J. Isaac, Dr. R. E. W. Wodehouse, Lord Horder, and Dr. W. Hutton.

As Officer.—Dr. F. B. G. Holmes, Dr. H. E. Gibbs, Dr. C. H. Tewsley, Major-General R. B. Ainsworth, Colonel R. C. Wilmot, Dr. W. D. Kirkwood, Colonel H. V. Prynne, Dr. G. Thornton, Dr. C. H. Francis-Williams, Dr. P. R. Bolus, Dr. G. B. Peat, Major W. Nunan, Dr. R. L. E. Downer, Dr. A. Heys, Dr. F. O'B. Ellison, Dr. W. N. West-Watson, and Dr. Phyllys P. Pigott.

As Associate Officer.—Dr. Dhanjibhai Hormasji Mehta.

As Serving Brother.—Dr. H. J. Slane, Dr. G. L. Pierce, Dr. S. B. Turner, and Dr. E. P. Dickin.

Dr. Bernard Hollander Memorial Meeting

At a meeting held on June 12th, at Essex Hall, London, Dr. H. J. Norman, speaking of the medical side of Dr. Hollander's activities, recalled his remarkable erudition and the fact that he seemed to require less than the ordinary amount of sleep. The result was that he was able to undertake much literary work, in addition to attending to a very busy practice as a mental specialist. Mr. J. P. Gilmour and Mrs. Stackpool O'Dell spoke of Dr. Hollander's work in connexion respectively with rationalism and phrenology. A resolution was carried to the effect that a Bernard Hollander Memorial should be established, and a preliminary committee was formed to this end.

International Congress of Radiology

The fourth International Congress of Radiology will take place at Zurich, Switzerland, from July 24th to 31st. At the opening meeting the methods adopted by different countries in their campaign against cancer will be reported on. In all about 400 lectures and reports will be given, and the greater part of them will deal with X ray diagnosis. The first Congress of Radiology was held in London, the second in Stockholm, and the third in Paris in 1931. Delegates from at least 30 countries will attend this year's congress, and the guests of honour will include Sir George Buchanan (president of the cancer commission of the League of Nations) and M. F. G. Boudreau (director of the health section of the League). During the congress latest technical equipment for radiology and electrical treatments will be exhibited.

Research on Tuberculosis

The Medical Research Council announce that they have made the following awards of Dorothy Temple Cross fellowships for 1934–35, under the terms of the benefaction in that name for research fellowships in tuberculosis : William Sayle Creer, M.B. Liverp., Lady Jones orthopædic research fellow in the University of Liverpool ; Alfred White Franklin, M.B. Camb., M.R.C.P. Lond., chief assistant to the children's department at St. Bartholomew's Hospital ; Philip D'Arcy Hart, M.D. Camb., M.R.C.P. Lond., assistant physician to University College Hospital ; Arthur Landau, M.B. Capetown, M.R.C.P. Lond., house physician at the Brompton Hospital ; Alastair Hamish Tearloch Robb-Smith, M.B. Lond., senior demonstrator of morbid anatomy at St. Bartholomew's Hospital. Dr. Robb-Smith's fellowship is tenable in Germany : the others at centres in the United States. The fellowship awarded last year to Dr. G. Gregory Kayne for work at centres in Europe has been renewed for a further period of six months.

The Royal College of Physicians of London invites applications for the Prophit scholarship from qualified medical practitioners with some experience of tuberculosis. The scholar will be responsible for the conduct of a survey into the incidence and progress of tuberculosis in selected sections of the community, by clinical examination and tuberculin testing, over a period of years. Further particulars will be found in our advertisement columns.

International Congress on Chronic Rheumatism

A congress was held at Aix-les-Bains from June 28th to July 1st, Prof. Fernand Bezançon presiding. Some 350 medical men attended, and official delegates were present from 20 countries. The subject discussed was rheumatoid arthritis, one day being devoted to pathology and ætiology, another to symptomatology and to clinical diagnosis, and another to therapeutics. Prof. Bezançon and Dr. Mathieu-Pierre Weil (Paris) described in detail the clinical picture originally presented by Charcot. Subsequent speakers, including Prof. Mouriquand (Lyons) and Prof. Roche (Geneva), discussed the relation of endocrine factors, infection, constitution, and the autonomic nervous system to the disease. Prof. F. Coste (Paris) reviewed the evidence on which the various theories of infection have been based, with special reference to the streptococcus, the gonococcus, and the tubercle bacillus. A great variety of different conditions was referred to under the title of rheumatoid arthritis, but the tendency of the speakers was to ascribe the clinical picture of this disease to the way in which the individual reacts to a variety of extraneous factors, rather than to a specific infection or metabolic upset. Dr. Francis Bach (London) emphasised the general decalcification of bone as one of the early pathological changes in rheumatoid arthritis. Dr. Gilbert Scott (London) described the bone changes visible in radiograms in cases of rheumatoid arthritis, and the diagnosis by this means from osteoarthritis, gout, and other conditions. Prof. Abrami (Paris) discussed the varied clinical forms of the disease, and Prof. Marañon (Madrid) its differential diagnosis. Dr. R. J. Weissenbach (Paris) and Dr. F. Françon (Aix-les-Bains) spoke on prognosis, and Prof. Kahlmeter (Stockholm) on the changes in the blood found in this disease. In connexion with treatment Sir William Willcox outlined the part played by focal infection in the genesis of rheumatoid arthritis, and the technique of its treatment by vaccines. Prof. Rathery (Paris) dealt with drug treatment and chemotherapy, Prof. Gunzburg (Brussels) with physiotherapy, Prof. Paul Mathieu (Paris) and Dr. Loring T. Swaim (Boston) with orthopædic treatment, and Prof. Leriche (Strassburg) with the role of surgery. The latter stressed the value of parathyroidectomy in the treatment of rheumatoid arthritis, and discussed the indications for arterial sympathectomy and arthroplasty. During the congress the new thermal baths were open for inspection, and the various methods of physical treatment available at Aix-les-Bains were demonstrated. The success of the congress was largely due to the efforts of the secretaries, Dr. Mathieu-Pierre Weil, Dr. F. Françon, and Dr. J. F. Forestier.

ADDRESSES AND ORIGINAL ARTICLES

VIRUSES IN RELATION TO THE ÆTIOLOGY OF TUMOURS *

By C. H. Andrewes, M.D., M.R.C.P. Lond.

MEMBER OF SCIENTIFIC STAFF, NATIONAL INSTITUTE OF MEDICAL RESEARCH

In the preceding lecture I put forward reasons for supposing that viruses might be ætiologically related to tumours. These fell under two main headings: first, viruses have been shown to cause tumours in birds; secondly, the proliferative changes produced by some viruses in cells make it not difficult to imagine that they could give rise even to true new growths.

Some Objections to the Virus Hypothesis

The virus hypothesis of cancer is, however, open to a number of very obvious objections, some of which we must proceed to consider.

NON-INFECTIOUSNESS OF TUMOURS

In the first place, tumours are not infectious. There is no evidence of any value that a tumour either of man or animal is acquired as a result of contact between one individual and another. I say this notwithstanding the vast literature which has accumulated on the subject of so-called cancer houses and, as regards mice, of cancer cages. Cancer is such a common disease that apparent instances of infection are bound to crop up simply as a result of coincidences or of causes other than infection with a cancer parasite. Exceptions must be made in favour of infectious warts and the transmissible venereal lymphosarcoma of dogs, neither of which is generally admitted as a "typical" tumour. Nor am I considering the very rare instances in which actual inoculation of tumour cells may have occurred.

The fowl tumours, which are certainly due to an extracellular agent, show no more evidence of infectivity than do the mammalian tumours. Rous and other workers since have fed fowls on tumour material and have attempted in other ways to obtain evidence as to possible modes of infection, but always in vain. Furthermore, when sporadic tumours appear in a flock of birds, the successive tumours which arise may be of very different histological types. Thus four successive spontaneous tumours appearing amongst the fowls on the Medical Research Council's farm at Mill Hill were a spindle-celled sarcoma, a polymorph-celled sarcoma, an osteochondro-sarcoma, and a tumour probably derived from muscle cells.[33]

Borrel[54] first advocated a virus theory of cancer because he thought there was evidence of infectivity of tumours, but to-day this evidence is discredited and advocates of the theory must adhere to it not because of but in spite of the data concerning infectiousness.

To produce any infection one requires at the least three things—a host, a parasite, and a set of circumstances permitting the parasite to infect the host. In many instances the importance of this third factor appears more striking than the mere bringing together of host and parasite—it is so with tuberculosis, with amœbic dysentery, and with tetanus. If tetanus were due to a virus and not to a cultivable bacterium, there would be but little more evidence of its parasitic origin than is available for cancer. Again, most cases of malignant endocarditis are caused by infection of the heart valves with an ordinarily harmless saprophytic streptococcus; no connexion can be traced between one case of the disease and another. Indeed, there is no direct connexion: a third factor such as I spoke of is all-important in the pathogenesis of the condition. Clearly then, a disease of parasitic origin need not be demonstrably infectious, and this objection to the virus theory of cancer cannot be stressed unduly.

MULTIPLICITY OF VIRUSES

Tumours are of many degrees of malignancy, of many types of tissue, of many species of animal. Pathologists have naturally recoiled at the thought that each of these different tumours might be caused by a different virus. Some tumours are extremely rare and one could scarcely imagine a virus which gave evidence of its existence only once or twice in a generation. Yet it seemed equally unlikely that one parasite could cause all types of tumours and that yet in the case of propagable tumours of animals each should remain true to type on transplantation. Gye's attempt to solve this dilemma will be discussed later.

Fowl tumours resemble those of mammals in their diversity of type, and it seemed, therefore, pertinent to inquire whether there was evidence that different growths of the fowl were caused by many different viruses or by one virus. I have sought to solve this problem by serological methods.

Most viruses evoke the production of antibodies which are demonstrated by their power of neutralising the virus in question when mixed with it in vitro. Complement-fixing and other antibodies may occur also but the neutralising properties are, with viruses in general, the easiest to demonstrate. Neutralising antibodies can be shown to be formed against fowl-tumour viruses; they occur in the largest amounts in the sera of fowls which have borne certain chronic tumours for at least five months.[55] Normal fowls, particularly as they grow older, may develop in their sera varying amounts of similar neutralising properties. Usually such sera are not very active, and in only a very small percentage of birds are they as potent as the sera of birds with chronic fibrosarcomata. The antibodies in fowls with a slow-growing fibrosarcoma (MH1) were found not only to be capable of neutralising filtrates of the homologous tumour but also to be active against the viruses causing other tumours of different histological types, the Rous No. 1 spindle-celled sarcoma, three fibrosarcomata (BS1, RF4, and RF11), and an endothelioma (MH2).[56] Rous No. 1 was, however, always more readily inactivated than the others. But Fujinami's tumour, another rapidly growing sarcoma, histologically exactly like Rous No. 1, was not neutralised. The few potent sera from normal birds acted like those from the fowls with fibrosarcomata: they neutralised Rous No. 1 most readily, Fujinami's sarcoma not at all, and the other tumours mentioned to an intermediate degree. It is likely, therefore, that the antibodies in the birds with chronic tumours represent only an enhancement of a property occurring to a varying degree in normal birds. The neutralising agent has the properties of other antiviral antibodies[57] and is unlikely to be the same as the inhibitor described by Murphy[58] as occurring in slow-growing fowl tumours and elsewhere. The results so far obtained indicated that viruses

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* The second Oliver-Sharpey lecture for 1934, delivered before the Royal College of Physicians of London on May 3rd. Lecture I. appeared in our last issue.

causing different types of fowl tumour were, if not identical, at least closely related antigenically.

Further light was shed by preparing sera in species other than the fowl. It was found that many fowl tumours would grow temporarily in the pheasant and then regress [59]; and these pheasants could be hyper-immunised and yielded potent neutralising sera. Such sera were found to be more specific than the fowl sera. Though cross-neutralisations occurred, antibodies from a pheasant immunised with one tumour were always much more active against filtrates of the homologous tumour than against those of another, even though the tests with fowl sera had shown that the two tumour viruses were closely related.[56] It seemed reasonable to suppose that two fowl-tumour viruses might have an antigenic group in common and might each have in addition a specific antigenic grouping of its own. Experiments on active immunity in pheasants confirmed the suggestion of an antigenic relationship between different viruses.[60] The Rous No. 1 sarcoma almost invariably produced fatal tumours in pheasants; other tumours, as just mentioned, commonly regressed. Pheasants hyper-immunised with material from such tumours were completely or relatively immune to the more malignant Rous No. 1, and such immunity was shown not to be accounted for by immunisation by fowl protein.

As already mentioned, the various fowl sera studied showed no neutralising power against Fujinami's virus. Sarcomata caused by this virus when grown in adult ducks commonly regress, and these birds can then be hyper-immunised just as can the pheasants injected with the Rous and other viruses. The anti-Fujinami sera prepared in the duck are most active against the Fujinami virus but also show some neutralising power against Rous and the other tumour viruses. It appears, therefore, that even the Fujinami virus has some antigenic relation to the others studied, although the connexion is a more distant one than between the Rous and those related to it (MH2, BS1, RF4, RF11).

The work of Gye and Purdy with antisera prepared in mammals confirms these results.[33] Antisera made by immunising goats with tumour extracts confirm the existence of a sharp antigenic distinction between the Rous and Fujinami viruses; but results obtained with the sera from immunised horses suggest that there is after all something in common between these two viruses antigenically.[11]

Studies along these lines have clearly not provided as sharp an answer as one could have hoped for. Serologically the various fowl-tumour viruses are neither identical nor entirely distinct. They seem rather to constitute a group of agents, some closely, some more distantly related. Very similar findings are met with amongst groups of allied bacteria which are shown to possess both group and specific antigens giving rise in the inoculated animal to corresponding group and specific antibodies. Of particular interest is the fact that the bacteriophages attacking the intestinal bacteria may also be classified into broad serological groups: minor antigenic differences are present here also among the individual members of each group.[61] [62]

SPECIFICITY OF FOWL-TUMOUR VIRUSES

One may approach in another way the difficulty presented by the remarkable individuality of every tumour. Everyone knows what extraordinary diversity there is amongst human tumours; and the same applies to the transplantable tumours of the mouse and rat. These maintain their individual characteristics from generation to generation, and one is not unduly surprised, knowing that the cells of the animal body may vary in any number of ways and that the transplantable tumour is merely continuing to reproduce the characters of the cells which are transplanted. But when one finds fowl tumours, transmissible by a cell-free agent, showing the same extraordinary diversity from tumour to tumour and the same constancy of characters when a single tumour is propagated in series, one naturally has to stop and think. No one, I think, can be blamed for being reluctant to believe in the virus theory of cancer when he is confronted with facts such as these.

Attempts at Reconciling Apparently Conflicting Facts

Those who have, within recent years, attempted to construct theories about tumours may be divided into two categories. First, there are those who have based their theories on the known facts about mammalian tumours and have ignored the avian sarcomata or else brushed them aside as inconvenient anomalies. Secondly, we have those who have faced the fact that tumours do occur in birds as well as in mammals, and have tried to frame a theory which shall be applicable to the tumours of both these orders of the animal kingdom. We need only consider those who fall into the second category, and see how they have attempted to explain the existence side by side in the world of filtrable fowl tumours and non-filtrable mammalian cancers, and how they have sought to account for the presence of a virus-like agent in fowl tumours which otherwise behave in a way so very unlike an infective disease.

1. *Filtrability of fowl-tumour cells.*—Many of our difficulties would be resolved if it could be supposed that very minute forms of the fowl-tumour cells occurred and that these could pass through filters or survive in desiccated tumour tissue and initiate new tumours when inoculated into a fresh host. The difference between mammalian and avian sarcomata might thus find an explanation. Unfortunately for this view, it has been impossible to demonstrate these supposed minute cells in filtrates: indeed it seems certain that the active agent is below the limits of resolution of an ordinary microscope. It is thus not only smaller than the smallest known cell of a higher animal, but very much smaller, smaller even than a bacterium. The filtrable cell theory, which was frequently put forward after Rous's discovery of a filtrable fowl tumour, has consequently been abandoned even by those who at one time advocated it.[63]

2. *Possibility of growth of a tumour cell from a small fragment.*—Since it has become clear that tumour cells could not themselves be filtrable, it has been suggested that a cell nucleus or a minute fragment of a cell nucleus might have the power of passing a filter and duly growing again into a complete cell.[64] Since comparatively small injuries to the nucleus will kill a cell, such a theory cannot appear very attractive to a biologist. The point might, however, be argued were it not for the existence of such tumours as Fujinami's sarcoma.[50] A filtrate of this fowl tumour can infect both fowls and ducks, and immunological tests show that the resulting tumour is formed in the one case of fowl, in the other of duck cells. No one can seriously maintain that a minute fragment of a fowl cell nucleus can ever grow up into a duck cell. Further discussion of this theory is therefore needless.

3. *The gene theory.*—"Gene" is the term used by geneticists to indicate the unit in the chromosome which carries a hereditarily transmissible character. It has been suggested by Lockhart-Mummery [64] and

others that a gene might become wild, loose from the chromosome which is its natural environment, and imprint its character on fresh cells with which it came into contact: such a theory has been put forward to explain the nature of viruses in general, including bacteriophages as well as those of tumour agents. It is urged that the size allotted by the geneticists to the gene is of the same order as that of viruses, and that the existence of a gene is not confined within the limits of a single species, as is proved by the occurrence of hybrids. It is difficult to argue positively about the possible behaviour of a biological agent which has never yet been shown to exist in a free state. Nor can one readily deny that a tumour agent *may* have similar physical properties to a gene, when the latter are purely a matter for conjecture. There has, however, been no suggestion, as far as I am aware, that a gene can act as an antigen, as a tumour virus can, in the animal in which it exists. In our present state of knowledge it seems wiser on the whole to confine our speculations to less fantastic channels.

4. *Theories which postulate that the tumour agent is a cell-product.*—We are left with two possibilities: the agent may be a small living micro-organism or a cell product which can stimulate another cell to unlimited proliferation and at the same time to the elaboration of more of the same cell product. The latter view has a number of advocates, of whom Boycott [65] and Murphy [66] have put forward the clearest arguments. The view is much worthier of consideration than the three we have already been able to dismiss. It seems most profitable to consider side by side the views that the tumour agent is a virus and that it is a cell product. It will be evident that a number of facts tell strongly in favour of its virus nature. Let us first see, then, what Boycott, Murphy and their followers are "up against" when they try to account for the agent as a cell product.

EVIDENCE FOR THE VIEW THAT THE FOWL-TUMOUR AGENT IS A VIRUS

There is no time now to discuss the question of whether viruses in general are small organisms; I am, for purposes of this discussion, considering a virus as a living micro-organism.

(*a*) The tumour agent is capable of unlimited multiplication, but, like other viruses and some higher organisms, only in the presence of living cells either in the intact animal or in tissue cultures.

(*b*) It causes the production in the infected bird of antibodies which, as already discussed, show group and specific affinities like those which characterise related groups of bacteria.[56] These antibodies behave in most ways like antibodies to other viruses.[57]

(*c*) Viruses vary in their resistance to chemical and physical agencies. The fowl-tumour agent resists heat, acidity, desiccation, and a variety of disinfectants much as viruses in general do. Gye and Purdy have pointed out the close resemblance of the Rous virus and the organism of bovine pleuro-pneumonia in their inactivation by acriflavine.[33]

(*d*) Many fowl-tumour agents can infect birds other than the fowl. Filtrates of Rous No. 1 sarcoma and several other tumours, including the MH2 endothelioma, will produce tumours in pheasants [59]; and Fujinami's fowl myxosarcoma will infect ducks, a species widely remote from fowls. It is worth recalling in this connexion the hare sarcoma of von Dungern and Coca [67] which was transmissible to rabbits.

(*e*) The fowl-tumour agents show evidence of adaptability. For a time after its discovery the Rous No. 1 sarcoma was transplantable only in blood relations of the Plymouth Rock fowl in which it had spontaneously occurred. Later, growth was found to be possible in other Plymouth Rocks and, still later, in any breed of fowl.[1] Now, after many years, it has been found to be transplantable to the pheasant also.[59] Except for this last stage, transmission to an alien species, this is the sort of behaviour one is accustomed to find amongst mammalian tumours which are transplantable only by means of cells. One is not surprised that living cells can gradually be accustomed to a more and more foreign environment; the occurrence of similar behaviour in a tumour transmissible by cell-free extracts seems to imply that the tumour agent also becomes in course of time adapted in the same way. It may also be mentioned that Fujinami [50] succeeded in growing his fowl myxosarcoma in ducks only after years of effort.

(*f*) The size of the tumour agent is evidence in favour of its living nature. My colleague, Dr. W. J. Elford, has prepared a series of graded collodion membranes, the pores of which can be measured with some accuracy and for a given membrane are extremely uniform.[68] With their aid he, with various collaborators, has estimated the sizes of a number of viruses: their diameters apparently range from about 150 mμ—or more than a tenth of 1 μ—in the case of vaccinia [69] down to about 10 mμ—or one-hundredth of 1 μ—for the virus of foot-and-mouth disease.[70] Filtration experiments with the Rous virus have proved difficult because of the sticky material which is associated with the virus in filtrates, but we have now succeeded by a new method in obtaining virus of high titre free from almost all detectable protein. Attempts to estimate the size of the virus in this purified material are still incomplete, but we can already say with some confidence that the virus is of the order of size of the larger rather than the smaller viruses previously measured.

BOYCOTT'S VIEWPOINT

Boycott and Murphy are alike in suggesting that the Rous agent is not a virus, but they reach a common position by arguing along rather different lines. Boycott [65] in 1928 suggested that there was perhaps no sharp line of demarcation between the living and the dead in nature. Each of the facts adduced in support of the living nature of viruses in general—and of the Rous virus in particular—could be paralleled in the world of admittedly inanimate objects. Thus other things than living organisms appear to multiply. For instance, one might expect a cell-stimulating autolytic product acting upon a tissue culture to lead potentially to the production of more of the same agent. Bordet [71] also has pointed out that the reproduction of thrombin in the clotting of blood bears analogies to the multiplication of an organism. Boycott also refuses to be deterred by the fact that the Rous agent can induce the formation of antibodies in an infected bird. He points out that although such an occurrence is usually evidence of the extrinsic origin of an agent, it need not necessarily be so. For the lens protein of an animal can act as an antigen when injected into the same animal species. Again, almost any antiseptic or physical agent which inactivates a virus such as that of fowl tumours can be shown to have also a destructive action on some unorganised substance.

I know of no one criterion by which one can define a living thing: one must in our present state of knowledge judge whether a thing is alive or dead by applying to it a number of criteria. Boycott's ingenuity has revealed a number of analogies to the Rous and other viruses in the inanimate world; but he has had to concentrate on one criterion at a time. I know of nothing but a living organism which can multiply *and at the same time* act as an antigen in the animal which it infests or injures *and at the same time* shows the same range of susceptibility to a whole series of physical and chemical agents as known micro-organisms *and at the same time* shows evidence of adaptability *and at the same time* has a size compatible with organisation of some complexity. As Rous and Murphy [72] wrote in 1912 of the tumour agent, "No single attribute among those determined suffices to show the nature of the agent; yet taken together its characters are those which we associate with micro-organisms."

I should hate to dispute Boycott's theoretical point that the line of demarcation between the live and the dead may be an artificial one; but for practical purposes I maintain that there is a very sharp difference between viruses (including the Rous virus and bacteriophages) on the one hand and the other, apparently transmissible, substances with which they have been compared.

MURPHY AND TRANSMISSIBLE MUTAGENS

Murphy [66] has, very naturally, been impressed with the difficulties of believing that spontaneous tumours can be due to a living organism, difficulties we have already discussed. But unlike Boycott, who doubts whether viruses in general are alive, Murphy seeks to separate off from the other viruses certain agents to which he would apply the name "transmissible mutagens." This category would include, I gather, the fowl-tumour agents, such an agent as that causing change of type amongst pneumococci and possibly also plant mosaic viruses and bacteriophages. The characteristics of a transmissible mutagen are, first, ability to direct the specific differentiation of the cell into an abnormal channel and secondly, of course, transmissibility. It seems a far cry from cancer to types of pneumococci, but we must diverge for a moment to see why Murphy brings the pneumococci into the story. The successive discoveries of Griffith,[73] Dawson,[74] and Alloway [75] have revealed that a product of one type of pneumococcus—let us say of type I.—can change, for instance, a type III. organism into a type I. in vitro, usually through the intermediate stage of an avirulent, rough organism. From the type I. so obtained one can extract more of the same product, which is capable of converting more type III. pneumococci into type I., and so on. The product thus appears to multiply when in contact with living pneumococci, and, according to Murphy, its action in changing the pneumococcus type is strictly comparable with that of the agent which causes fowl cells to become malignant. From our earlier discussion of Boycott's views, it will, however, be obvious that the pneumococcus type-switching agent only has in common with the Rous virus one property of a living thing—power of multiplication. So far as has been shown, it possesses *none of the other* properties on which I have laid stress; and the analogy with the Rous virus does not therefore appear to me particularly striking.

In a series of papers Murphy [66] and his co-workers have emphasised differences between the Rous virus and viruses in general. They maintain that the Rous agent can be purified by chemical manipulations which would be fatal to a living thing; that antigenically it does not behave like an organism, and that it differs also in other respects, such as in its high resistance to inactivation by ultra-violet light. By precipitation and solution in ways which I have no time to discuss in detail, they obtained a tumour agent of considerable potency yet free from demonstrable protein. Murphy says "it is hardly conceivable that the active fraction I have thus succeeded in obtaining, a substance purified by repeated precipitations, could carry with it through all these manipulations a living organism or virus." [76] Elsewhere he talks of the purification of the agent "by being repeatedly dissolved in alkali and reprecipitated with acid." [77] Almost every month I see these claims quoted in discussions on cancer and elsewhere in support of the view that the Rous agent *cannot* be a virus. But this "treatment with alkali and acid" which sounds so drastic, actually involves adjustments of pH only within a range of 4·7 to 8—nothing, in fact, which would damage the majority of viruses very seriously. Further, vaccinia virus can be purified by adsorption and elution; or can be carried down on a precipitate by acidifying and then be freed when this is redissolved.[78] In fact, these experiments afford no basis whatever for distinguishing the Rous virus from other viruses. Murphy has also attempted to show that the antigenic behaviour of fowl-tumour agents is out of the ordinary.[79] I have already alluded to the development of neutralising antibodies in tumour-bearing fowls. Further, to one who is familiar with serological work with viruses, Murphy's own experiments on the immunisation of rabbits with purified tumour extracts only serve to emphasise the close correspondence between his work and the findings of workers with other viruses.

Three other differences between tumour-agents and viruses emphasised by Murphy concern what appear to me to be minor points altogether.

(*a*) Sturm, Gates, and he[80] selected for study one physical agent, ultra-violet light, and found, as Baker and Peacock[81] did also, that the tumour agent was more resistant to inactivation by it than were the organisms which they selected to compare with it. It has lately been reported,[82] however, that the resistance of tobacco mosaic virus to ultra-violet light is even greater than that of the Rous virus.

(*b*) Reynals and Murphy [83] reported that the Rous agent was fixed and inactivated by susceptible tissues, but not by those of insusceptible species. In this respect it recalls the fixation of bacteriophages by bacteria. Gye,[11] however, has failed to confirm Reynals and Murphy's finding.

(*c*) The action of the tumour agent is inhibited by certain extracts of slow-growing tumours (inhibitors) which appear to be distinct from true antibodies.[68] Similar substances are reported by Murphy to occur in normal tissues.[84] Some work of Shope's [45] suggests the possibility of a similar sort of action against the virus of filtrable rabbit warts described by him.

To sum up, the two major differences alleged by Murphy between the Rous virus and other viruses have *no existence in fact.* The minor ones appear to me to be no greater than those which could be found between any two viruses having rather different parasitic habits.

Fränkel,[85] on the basis of attempts to purify the Rous virus by adsorption and elution, has similarly sought to place the virus in a category of "virus-enzymes" apart from most other viruses. The derogatory remarks I have made about transmissible mutagens may be taken as applying to virus-enzymes also.

Carrel [13] has suggested that the Rous virus is not a true virus but rather comparable with the bacteriophage. I shall not quarrel with him on this score inasmuch as I consider that the evidence that the bacteriophages constitute a group of living organisms is becoming harder and harder to resist.

I have often been tempted to believe, with Boycott and Murphy, that the Rous agent is a cell product and not a living parasite; but its analogies with other viruses are so striking that I cannot conscientiously disregard them. It is easy to understand the point of view which refuses to believe that the filtrable agent in a spontaneous tumour—or a tar-induced tumour—is a virus. But if the agent has all the properties of a virus, one can go too far in denying that it is a virus simply because it turns up in an unexpected place. If one found something with all the properties of an elephant on top of the Matterhorn, rather than deny it was an elephant one would seek to explain how it got there.

GYE'S TWO-FACTOR HYPOTHESIS

Very different is Gye's attempt to solve the problem; and whatever be the merits of his hypothesis it cannot be denied that his paper,[32] published in 1925, stimulated a world-wide interest in the filtrable fowl tumours which for some years had been undeservedly neglected. Gye suggested that there was one cancer parasite—or at most a small number of them; he could not believe in a different virus for every tumour. To explain the specificity—and the transmissible specificity—of the fowl-tumour viruses, he suggested that the virus by itself could not infect a cell; to do so it must be associated with a second, chemical, factor; this second factor determined the type of tumour which would be produced by the virus. The nature and origin of the second factor was very obscure; but Gye's later work shows that he believes it to be a product of the fowl cells. Put rather crudely, his idea is that a virus linked on to some product of a fibroblast produces a spindle-celled sarcoma, linked to some constituent of an endothelial cell it gives rise to an endothelioma, and so on.

In the work he reported in 1925 he had attempted to separate the two factors in a fowl-tumour filtrate, to show that each by itself was ineffective but that when they were recombined they could produce a tumour. The virus was apparently destroyed by chloroform or acriflavine and the specific factor left; on the other hand, when filtrates were incubated anaerobically in a special culture medium the virus was believed to survive while the secondary factor disappeared. Other workers failed to confirm these experiments of Gye's, and after many years' efforts directed to the perfecting of a fool-proof technique, he himself realised that the difficulty of controlling a number of variable factors made it impossible to obtain reproducible results by his original methods. Nevertheless, he did not abandon his hypothesis but was inclined to believe that the association between virus and second factor was more intimate than he had thought at first, perhaps too intimate for breaking-up and reunion to be accomplished at all readily.

Fresh light has been thrown by his later work with Purdy along serological lines.[33] The prolonged immunisation of goats with Rous extracts yielded neutralising antisera against the Rous virus of considerable potency. But, unexpectedly, neutralising sera could also be obtained when goats were immunised with extracts of normal chicken embryo. The sera obtained in these two ways were not, however, identical. There was evidence that the anti-tumour sera contained two antibodies, one active against the virus, the other an anti-fowl element. The goats immunised with embryo-extract contained in their sera only the second, the anti-fowl antibody. Either antibody could neutralise the Rous virus, but while the antiviral one—like other antiviral sera—acted in the absence of complement, the second one would only neutralise in the presence of complement. The anti-fowl antibody could be absorbed out of a serum by repeated absorptions with chicken embryo: the specific antibody to the virus could not. (See Figure.)

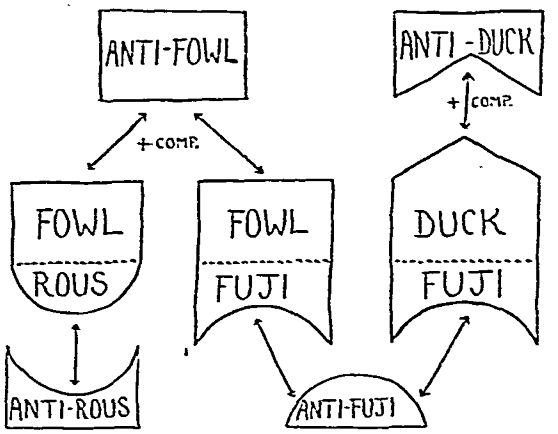

Diagram showing neutralisation of Rous virus, fowl-grown Fujinami virus, and duck-grown Fujinami virus by various goat antisera.

These results, in the opinion of Gye and Purdy, constituted fresh evidence in favour of the two-factor hypothesis. Apparently the active agent could be neutralised by an antibody reacting with either of its constituent parts—the virus element or the fowl element—though for unknown reasons complement was necessary to enable one of the antibodies to act. Additional support for this view was obtained when sera were prepared also against Fujinami's fowl sarcoma; this, as already mentioned, infects both ducks and fowls. When extracts of fowl-grown Fujinami tumours were used to immunise goats the sera obtained were active against the Fujinami virus, as might be expected; anti-fowl sera also inactivated the virus, as it did the Rous, in the presence of complement, but there was no specific cross-immunity between the Rous and Fujinami viruses. Any cross-neutralisation shown by the anti-tumour sera could all be accounted for by the anti-fowl element in those sera. This antigenic difference between the Rous and Fujinami viruses has already been revealed by the experiments with fowl, pheasant, and duck sera.[56]

But if now Fujinami's tumour was grown in a duck and extracts of that tumour were used for similar experiments, behold, the virus was still neutralised by specific anti-Fujinami sera but no longer by the anti-fowl sera! On the contrary, it was now inactivated by anti-duck sera as the fowl-grown tumour had not been.[56] A Fujinami filtrate is thus neutralised by anti-Fujinami-virus antibody wherever the tumour has been grown, and by anti-fowl or anti-duck serum as well according to the bird in which it has developed. This clearly supports Gye's notion that the active agent is of dual nature and that its activity is destroyed if a serological reaction with either moiety takes place.

The neutralisation by anti-fowl serum cannot be explained on the basis that the virus is mechanically carried down on a precipitate and so put out of action, for either neutralisation or precipitin formation may occur in the absence of the other.

Recently Gye has shown[56] that an antibody to fowl serum-proteins has no neutralising power against a tumour virus; extracts containing cell nuclei must be used to obtain a potent antiserum. He feels, therefore, that his second factor is perhaps closely related to the proteins of the cell nucleus itself.

Gye's hypothesis may be right: its claims to be seriously regarded rest, in my opinion, on theoretical considerations and on his later, serological, work rather than on his earlier attempts to separate and recombine two factors. I do not feel, however, that the serological results in themselves prove the truth of his main contention. The neutralisation of the Rous virus with anti-fowl serum does indeed suggest most strongly that the virus is more intimately associated with fowl-protein than are other viruses with the proteins of their hosts. But it remains purely a speculation that this associated fowl-protein determines the specificity of the virus. For all we know to the contrary, the Rous virus may be linked to exactly the same fowl protein as is the MH2 endothelioma virus. One can explain the serological results in other ways than Gye and Purdy do. To give but one example, the action of anti-fowl antibody and complement might be to strip from the virus a protecting protein without which it was too labile to survive.

On purely theoretical grounds also I find the two-factor idea not wholly satisfying. There are many different connective-tissue tumours of the fowl, varying in their rate of growth, in the localisation of their metastases and in other ways. It is true that the Rous sarcoma itself varies from time to time in its rate of growth; these variations possibly correspond to differing amounts of Murphy's inhibiting factor in it. But this and other fowl sarcomata all vary around their own means; one does not turn into another. In most of them cells of the fibroblast-fibrocyte series are presumably "cancerised"; can one believe in distinct specific factors corresponding to a number of slightly different fibroblast-like cells and, if not, has the second factor any value as an explanation of specific differences amongst such tumours? Is it not simpler to believe in a virus or group of viruses which under certain conditions is capable of remarkable specialisation or adaptation?

THE INDIGENOUS CANCER-VIRUS

The last hypothesis which I wish to discuss is not a new one; it is certainly not of my own invention; it may be regarded as being in its main outline the highest common factor of the views of all who have seriously considered the virus theory of cancer, including Rous and Gye. It supposes that when tar or X rays or other agents initiate malignant changes in the cells of a mammal or bird, no virus is introduced from outside; virus is there already. The tar or other agent merely enables the virus to infect or cause pathological behaviour of the cell. As Borrel[54] said in 1910, "l'Organisme normal, non preparé par une cause adjuvante, n'a pas de cellules receptrices pour le virus cancéreux." The properties which must be postulated for a cancer-virus have been discussed recently by Rous.[87] I should like to quote a few of his remarks:—

> "Clearly the supposititious infectious agent can be no ordinary one; . . . a living entity responsible for such growths (tumours) must require for effectiveness a very special basis of predisposition. . . . The agent must be present frequently in the animal body and well-nigh ubiquitous in nature, else tarred mice in all parts of the world could not regularly become cancerous. On the other hand, it can only occasionally reach cells susceptible to its action, or the cells must rarely become susceptible. . . . One may assume that the hypothetical cancer-producing agent leads an existence in or upon the host, and is harmless save on special occasion—like the staphylococci or the colon bacillus—or that it passes in and out of the body frequently without causing harm save when highly unusual conditions provide it with a foothold—as happens with actinomyces.'

In experiments reported in a paper, from the introduction to which I have just quoted, Rous and Botsford[87] show that sheltered mice—mice reared from an early age on as far [illegible] sterilised cages and on [illegible] cancer just as readily when tarred as do mice reared under conditions rather dirtier than usual. They deduce that if a virus is responsible for tar tumours it cannot have reached the mice from outside during the period of tarring, during which the tumours developed.

If critics of the virus hypothesis realised that its upholders considered the ubiquity of the virus as a necessary feature they would not speak of "materials (fowl-tissues) which certainly do not contain a virus" as Murphy[76] does or of "fowls acknowledged to be virus-free" as Haddow does.[68] One cannot certify a fowl free of an invisible virus any more than one can by naked-eye examination certify a milk free from tubercle bacilli. In favour of the presence of a virus in normal fowls is the occurrence of neutralising antibodies against Rous No. 1 virus in normal fowl sera. As already mentioned, in a small percentage of fowls these antibodies are quite potent, but the majority of normal fowl sera will be found to have a little neutralising power—such as is not present in normal human, rabbit, duck, or pheasant sera. This finding is recorded by Pentimalli,[89] by Andrewes,[55] and by Sittenfield.[90] The reported recovery of a tumour agent by Murphy[76] from normal fowl testis may also be of significance.

As to how the predisposing causes could permit a virus to produce its effects different workers have speculated rather differently. Some would believe that only under abnormal conditions could the virus penetrate and infect the cell. Others would rather conceive that the cells were already inhabited by symbiotic viruses and that under the influence of a carcinogenic agent the balance between virus and some controlling mechanism became upset. The last conception has the merit that a greater or lesser tilting of the balance in favour of the virus could be invoked to explain gradations from a wholly benign to a highly malignant tumour. Rous,[87] as quoted above, seems to favour an existence of the virus on the surface of the host or within its alimentary canal; Borrel[54] has emphasised the possible rôle of parasitic worms or acari as vectors of a virus; Cramer[91] has suggested a non-pathogenic intracytoplasmic virus, perhaps entering the nucleus under abnormal conditions. Further knowledge is needed before such speculation can be fruitful, but I should just like to propound one question: where could the supposed cancer virus normally multiply? It seems inconceivable that it multiplies only in tumour cells; one can hardly believe that material from human tumours could ever become widely disseminated; Rous and Botsford's experiments with sheltered mice also tell strongly against this possibility. If not in tumour cells, it may normally multiply within normal cells or outside cells altogether. One cannot press the analogy too far, but it is perhaps pertinent that the known viruses seem all to have a strictly intracellular habitat.

In suggesting that a symbiotic virus might occur in normal cells I am fully aware that supposed symbionts of mammalian cells have been described by many workers in the past. Their claims, particularly when they sought to identify mitochondria with bacteria, have not withstood critical examination. None of them, of course, used optical methods which could have revealed objects of the size which we now know that viruses possess.

The idea that tar and similar agents may act in such a roundabout way as I have suggested may not appeal to those who would prefer a simpler solution of the cancer problem. There are, however, analogies for this sort of finding. Mere raising of the body temperature will produce on the face an eruption of herpes simplex—another virus disease—in 50 per cent. of human beings.[92] Tarring itself will render sensitive to certain strains of herpes virus the skins of guinea-pigs which are normally refractory.[93]

At the conclusion of a recent discussion on carcinogenesis at the Royal Society, Prof. Boycott [94] criticised the conception of a virus which was present in normal cells and ordinarily non-pathogenic. "One had better," he said, "call it something other than a virus." But why not call it a virus if, in fowls, it has the same properties as other viruses? Many symbiotic intracellular organisms are known throughout the animal and vegetable kingdoms. It would be strange if viruses never acted as symbionts. The symbiotic bacteria and fungi of insects afford a particularly useful field for study in this connexion; they are transmitted in some instances through the egg, and many insects cannot be obtained free from them. These symbionts can be seen going through the same life-cycles as their close relations which grow on culture media outside the body.[95]

One point about this indigenous virus hypothesis will not have escaped the watchful critic. Starting from our knowledge of the existence of avian neoplasms caused by viruses, we have come to consider the possibility that tumours of mammals may also be of parasitic origin. We have been forced to conclude that if a cancerous virus is at work here it must be able to act, not on normal, but only on predisposed cells. Yet where fowl tumours are propagable by cell-free agents, there must be a virus capable of acting on normal cells also. Clearly one will have to suppose that fowl-tumour viruses, unlike those of mammals, can become enhanced in virulence as they multiply rapidly in a tumour, so that they can eventually attack cells of normal as well as of abnormal sensitivity. As an alternative to the acceptance of Gye's two-factor theory one can imagine that, whatever were their properties in their old symbiotic days, they are now only able to multiply unrestrainedly in the type of cell in which they have recently become accustomed to doing so. Comparison of the neurotropic and viscerotropic strains of yellow fever virus in rhesus monkeys shows an example of adaptation of a virus to life in different cells of the same host.[96]

Conclusion

The following are the points I have tried to emphasise in these two lectures:—

(1) The filtrable fowl tumours are true tumours, only differing from those of mammals in that a causative agent or agents can be demonstrated apart from the cells.

(2) The properties of this agent correspond so closely with those of known viruses that we are not justified in excluding it from the virus group. Our only grounds for doing so would be its occurrence in spontaneous tumours in circumstances where we should not expect to find a virus: such grounds do not seem to me to be reasonable.

(3) Knowledge of the natural history of other viruses makes it easy to understand how the phenomena of tumour-growth might be produced by a virus: the mechanism of the inception of a spontaneous growth remains, however, a difficulty.

(4) The theoretical objections to the parasitic theory of cancer are no longer tenable in view of the facts of the filtrable fowl tumours.

(5) Discussion of the conception of an indigenous virus has suggested lines along which the parasitic hypothesis might be reconciled with the facts which appear at first to render it so improbable.

The facts and arguments which have been brought together in these lectures afford only indirect and circumstantial evidence in favour of the view that tumours in mammals may be of virus origin. Much more direct evidence is required before we can be prepared definitely to uphold such a theory. But I do venture to make the modest suggestion that on the available facts the parasitic hypothesis merits careful serious attention and not, as in the past, summary dismissal.

"No explanation of cancer," says Rous,[87] "is worthy of attention that cannot be tested." The important recent advances in our knowledge of viruses suggest numerous methods of attack on the cancer problem from the angle suggested by the virus hypothesis. It may be possible before long to obtain reasonably pure suspensions of the Rous virus particles, to agglutinate these with antiserum, to measure their size by filtration or with the aid of the centrifuge, and even to photograph them. Such things can be done with some other viruses which are probably of the same order of size. If fowl-tumour viruses could be investigated in a similar way one could later proceed to study the mammalian tumours along entirely novel lines. In emphasising the importance of attacking the tumour problem in such a way I do not wish to belittle the valuable contributions of the clinician, the statistician, the histopathologist, the organic chemist, and the biochemist. The attack by the virus worker must be considered, not as in opposition to theirs, but as part of one campaign.

In the past the parasitic theory of cancer has been light-heartedly dismissed by many students of tumours who have no personal experience of work with viruses. I dare to hope, therefore, that there may be some value in a contribution to the subject from a virus worker, even though the limitations of his knowledge of many aspects of the tumour problem are all too plain.

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THE VALUE OF AEROCYSTOGRAPHY

By Norman Ross, M.B. Leeds
LATE SENIOR HOUSE SURGEON, NORTH STAFFORDSHIRE ROYAL INFIRMARY

(WITH ILLUSTRATIONS ON PLATE)

FOREWORD

By T. H. Richmond, O.B.E., F.R.C.S. Edin., T.D.
HON. SURGEON TO THE INFIRMARY

The following article by Dr. Norman Ross has been written after two years' routine investigation of every case admitted to my wards at the North Staffordshire Royal Infirmary giving a history of possible vesical trouble. The technique he has elaborated is simple, and the time spent has been fully justified by the results. With aerocystography the enlarged lobes of a benign hypertrophy of the prostate give a smooth outline as compared with the irregular outline of a malignant prostate; calculi are easily located; vesical tumours and diverticula are defined; the capacity of the bladder can be demonstrated, and the thickness of the bladder wall appreciated. Much of the success of this work is due to the excellent X ray photographs taken by Dr. John Bromley, the honorary radiologist.

INTRODUCTION

In January of last year I published a paper on the radiographic diagnosis of prostatic enlargement—i.e., radiography of the bladder after it has been injected with air. Since that time I have had ample opportunity of furnishing further proof of the utility of an aerocystogram in the diagnosis of bladder and prostatic diseases.

In my last paper I was mainly concerned with intravesical enlargement of the prostate, and showed the unreliability of rectal examination in establishing a diagnosis. Thus in many cases where there is little or no palpable enlargement of the prostate as felt per rectum, cystostomy might reveal marked sub-trigonal projection; while in other cases marked enlargement per rectum is not necessarily indicative of intravesical involvement. Further, I pointed out that the symptoms of prostatism may be due, not to enlargement of the prostate, but to a "median bar" formation ("contracture of the neck of the bladder" or "prostatisme sans prostate") which demands an entirely different form of treatment from prostatic enlargement.

The value of cystoscopy as a confirmatory means of diagnosis was then discussed and various disadvantages described: (1) owing to contracture of the neck of the bladder it may be impossible to pass the cystoscope; (2) hæmorrhage from the passage of the instrument may cloud the field and prevent distinct vision; (3) gross sepsis may also cloud the field; (4) severe pain may necessitate an anæsthetic (general or spinal); and (5) an expert cystoscopist may not always be at hand. Aerocystography was then offered as an alternative method of diagnosis where the above contra-indications to cystoscopy are present. En passant, I mentioned its value in other types of cases apart from enlargement of the prostate, and it is with these that I wish to deal in the present paper. It must be clearly understood that, except in so far as the above contra-indications to cystoscopy are concerned, I do not advocate the aerocystogram in preference to the cystoscope, which can never be replaced. I merely regard it as a valuable alternative, and one of great importance in the chain of procedures normally carried out in the investigation of the pathological bladder or prostate.

The technique of aerocystography was fully detailed in my first paper. Reduced to simplest terms it consists of (*a*) complete emptying of the bladder, (*b*) injection of air into the bladder through a very small rubber catheter by numerous repeated fillings with a 20 or 50 c.cm. syringe, and (*c*) Potter-Bucky radiography. A low kilovoltage tube is used (40 to 50 K.V. should be quite sufficient), the obliquity of the tube being 15° to 25°. Occasionally a posterior film is taken with the central ray directed obliquely upwards and forwards so as to project the sacrum and coccyx above the field. The objective is merely the production of a sharp contrast between air and solid tissue. Even muscular fasciculation can be brought out to a nicety and, in fact, any structure which interrupts the regular outline of the interior of the bladder can be rendered clearly visible.

I propose here to confine myself to three other conditions, apart from prostatic enlargement, in which we have found aerocystography of great aid in making a pre-operative diagnosis—viz., distinction between simple and malignant prostatic enlargement, the diagnosis of vesical neoplasms, and "prostatic bar obstruction."

DISTINCTION BETWEEN SIMPLE AND MALIGNANT PROSTATIC ENLARGEMENTS

In the aerocystogram a normal bladder shows an outline which is perfectly clear and circular (Fig. I.) with an uninterrupted margin and smooth walls; its capacity, as measured by the number of fillings required, should be about 300 c.cm. When a film is taken at the correct angle, which is the same as for ordinary radiography of the bladder (*15°–25°*), the lower margin should be seen about ¼ in. above the margin of the pubic bones (in a full-sized plate), quite distinct, running laterally within the ileopectineal lines to the iliac bones. The extent to which it rises above the promontoric line depends, of course, on its distensibility. A large bladder is usually ovoid in shape, owing to lateral compression in the pelvis, and may be displaced somewhat to the right by a loaded pelvic colon. As gas in the sigmoid often obscures the interior of the bladder there should be a good preliminary clear-out of the bowel before the radiogram is taken. With benign intravesical enlargement of the prostate (middle and also perhaps lateral lobes) there is an obvious projection at the base of the bladder (*Fig. II. on Plate*). The shadow is definitely conical in shape and quite unmistakable, and its edges are continuous with those of the *inferior* vesical margin. The shadow is almost as dense as the catheter inside the bladder. In the female a some-

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what similar shadow may be shown by a cervical fibroid compressing the vesical neck. Calculi are frequently seen in the prostatic substance (Fig. VI.), their situation being thus definitely established, and are thrown into greater relief than in a normal radiogram of the pelvis. The capacity of the bladder depends on the duration of the obstruction. With a short history the organ is usually within the pelvis, but with a long history its capacity may have increased to 600–900 c.cm., so that it rises as high as the fourth or fifth lumbar spine.

With a spheroidal-celled carcinoma of the prostate, again, an unmistakable shadow is cast at the base of the bladder, but instead of the outline being regular it is nodular and perhaps more confined to the one lateral lobe than the other and projects beyond its normal boundaries (Fig. III.). The discovery of a malignant prostate may come as a great surprise where there is nothing either in the patient's history or in the rectal examination to suggest it, but the aerocystographic picture can be relied upon and, when capably interpreted, is almost as trustworthy as the histological examination. It is usually stated that about 2 per cent. of clinically simple prostates are malignant, but this refers only to those which, when examined per rectum, have none of the characteristics of malignancy. In many, at least, of these cases an aerocystogram will reveal the true condition. Neither tuberculosis nor gumma of the prostate will produce a picture anything like it. A multiple calculous prostate may give rise to some difficulty, but usually the calculi can be seen individually within the prostatic shadow, like small seeds. Prostatic cysts have been described, and although they are very rare they may conceivably mislead in interpretation, but I have not had any experience of these; indeed very few have been described.

Lower, in 1915, described a case of difficult urination for eight years. A small cyst about the size of the thumbnail was found protruding from the prostatic urethra into the bladder, and was successfully removed. Ekehorn described a similar case. The man was in hospital twice with acute retention. On each occasion the cyst had been burst by the passage of a catheter and caused no further symptoms until it had grown again. The pathology of these cysts is very obscure, but possibly it is associated with chronic prostatitis, or they may be congenital. Young noted and described nine cases from the literature.

In Fig. III. the essential features of a malignant prostate in an aerocystogram are readily observed: (1) the nodularity of the shadow; (2) the enlargement greater on the right side than the left; and (3) infiltration of the growth beyond the normal boundaries of the prostatic shadow. It is interesting to note how well the phlebolith (to the left of the prostatic shadow in the radiogram) is thrown up by contrast with the air. The bladder wall in this case is thin and smooth, there being no crenation or hypertrophy; it is very distensible, and the capacity is about 600 c.cm., showing a long history of obstruction.

The following is the case-history relating to Fig. III.:—

CASE 1.—The patient, aged 74, was perfectly well until two months before admission to the North Staffordshire Royal Infirmary, when he had a sudden attack of painless hæmaturia. This attack lasted about two days, and passed off just as suddenly as the onset. Since then he had had twelve attacks of hæmaturia, each attack being painless and quite paroxysmal. There had been slight aching in the back, but no pain in the legs and no cachexia. He gave a history of nocturnal frequency of micturition, but only since the onset of the hæmaturia and never before. There was no history of retention or retention with overflow. His general condition was good and there was no anæmia; but the tongue was dry and coated white. The abdomen showed nothing abnormal, and there was no distension of the bladder and no palpable enlargement of the kidneys. The spine and pelvic bones were clear. Per rectum there was no abnormality: the prostate could not be felt enlarged; there was no induration, no nodularity, and no fixation of the rectal mucous membrane. The residual urine measured 6 oz. The urine examination was as follows: specific gravity, 1012; reaction, acid; albumin, + +; polymorphs, + +; red blood-cells, +; numerous epithelium cells; no casts; no bilharzia ova. The blood-urea was 55 mg. per 100 c.cm. and MacLean's urea-concentration test showed definite distress of kidney function.

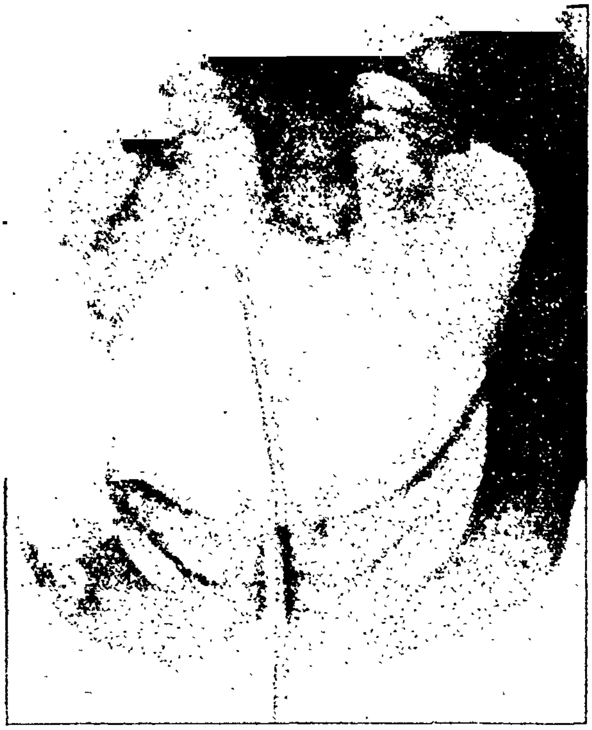
FIG. I.—A normal aerocystogram. Note the well-marked outline of the bladder thrown up by contrast of air with solid tissue.

Hæmorrhage prevented cystoscopic visualisation in this particular case, as did also an intractable cystitis following on repeated catheterisation. The provisional diagnosis from the history was one of papilloma of the bladder. That this presumption was wrong is clearly shown by Fig. III. For confirmation of the diagnosis of malignant prostate a suprapubic cystostomy was carried out. The intravesical projection was hard and nodular to the touch, and was spreading up the side of the bladder wall beyond the lateral margin of the trigone on the right side. There was as yet no ulceration. A portion was taken for section, and Dr. E. C. Myott reported: "The gland has become cystic with proliferating papillomatous projections. The lining cells are massed, and have changed in type. Malignant adenoma."

It was decided to treat this case by interstitial irradiation from within the bladder, and 9 × 1 mg. radium needles (length 27 mm. filtered through 0·5 mm. platinum) were used, being inserted through the suprapubic wound. The man appeared to be making good progress, but three days after operation he unfortunately developed a catastrophic pulmonary embolism and died.

The fact that painless hæmaturia may result from an intravesical enlargement of the prostate is noteworthy. Both simple and malignant enlargements may produce this symptom. Persumably it is due to the rupture of the "vesical piles"—i.e., the submucous venous dilatation resulting from pressure by the growth on the prostatic plexus of veins. With a malignant prostate ulcerating through the bladder mucous membrane, hæmorrhage would also be produced, but owing to the coincident cystitis would not be painless. In the above case the aerocystogram provided the only means of making a certain pre-operative diagnosis.

VESICAL NEOPLASMS

Although in most cases of vesical new growth cystoscopy is satisfactory, it is useful, for the reasons I have stated, to have a second means of diagnosis should it fail. Even a small papilloma can be visualised by aerocystography (Fig. IV.).

The value of this form of diagnosis, however, is not confined to the recognition of the presence of a tumour, for a fair idea of the clinical malignancy or otherwise of the growth can be arrived at, bearing in mind the following essential differences between malignant and benign vesical tumours :—

1. Multiplicity of the growths.
2. Irregularity of their outline on the radiogram.
3. A malignant growth tends to be sessile, whereas a simple papilloma is pedunculated.
4. Infiltration along the bladder wall.

These are the principles which guide us in a cystoscopy or open operation (in the latter, of course, induration is a most important additional factor) and which can also be safely relied upon in interpretation of an aerocystogram, although very often a clinically benign tumour may be histologically malignant.

Villous papilloma may be easily recognised (Fig. IV.). The papilloma may be sessile or pedunculated. Naturally, unless large, the tendrils will not be seen, but these are not necessary for the establishment of a diagnosis. These tumours are rarely situated on the trigone but usually to the outer side of one ureteric orifice ; hence it is not likely that they will be obscured by a prostatic shadow. Often the oblique line of the intramural part of the ureter is visible, as it is raised under the mucous membrane by the muscle of Astley Cooper, and the papilloma may be seen lying close to this. This can be quite clearly seen in Fig. IV. On first appearance it is very similar to the spine of the ischium. The following is the case-history :—

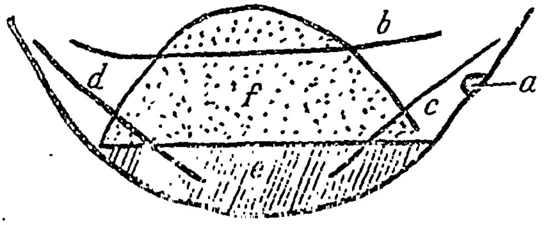

FIG. IV.A.—Diagrammatic representation of Fig. IV. (explained in text).

CASE. 2.—Age 59 years. Twelve months before his admission to the North Staffordshire Royal Infirmary the patient had an attack of scrotal pain, aching in nature, and lasting two or three days. This was unassociated with any urinary disturbance, and after the attack he was perfectly well until a week before admission, when he had an attack of painless hæmaturia lasting three days and then clearing up. There had been occasional pain down the backs of both thighs. Apart from the hæmaturia, micturition was normal, and there was neither frequency nor retention. The bowels were regular, there was no loss of weight, and he was well nourished. The skin was not unduly dry, but the tongue was dry and coated white There was nothing abnormal in the abdomen. Per rectum there was slight enlargement of the prostate backwards. The surface was smooth and the consistence elastic. The median groove was well defined, and there was no palpable enlargement of the vesicles. The prostate was not tender.

A preliminary diagnosis of vesical papilloma was made, and he was admitted to hospital for investigation. His urine was acid, specific gravity 1014, with a faint trace of albumin. The blood-urea was 52 mg. per 100 c.cm., and the urea-concentration test showed no great impairment of kidney function. The aerocystogram, which was later confirmed by cystoscopy (found possible in this case), revealed a number of highly interesting points. In Fig. IV.A can be seen :—

(1) The papilloma (*a*), lying about half the breadth of the superior ramus of the pubes from the ischial spine and similar to it in appearance. It is a typical "long-distance" photograph of a villous papilloma. It lies just outside the crossing of lines *b* and *c*, representing the left ureteric orifice (*b* is Mercer's interureteric bar, and *c* and *d* two sides of the trigone). The papilloma is sessile in type. (2) A marked enlargement of the middle lobe of the prostate. This is regular and well defined, and is obviously a simple senile hypertrophy. (3) Immediately in front of the latter is a fibrous trigonal "prostatic bar," running between the two sides of the trigone and then terminating sharply. A combination of marked prostatic intravesical enlargement and median bar formation is extremely rare. (4) The bladder wall itself is thin and is beginning to dilate. There is no hypertrophy or fasciculation, and the capacity is 300 c.cm.

CARCINOMA OF THE BLADDER

Thomson-Walker classifies vesical carcinomas according to their macroscopic characters into three groups : (1) malignant papilloma ; (2) nodular growths ; (3) infiltrating growths divisible into (i) squamous epithelioma ("chancroid"), (ii) cylindrical epithelioma or adenocarcinoma (this is rare), (iii) spheroidal-celled carcinoma.

Fig. VII. shows a typical carcinoma of the nodular type. There are five growths, indicated by the figures ; 1 and 2 are the largest and most irregular in outline. They are surrounding the trigone, which is itself clear of growth, a rather typical finding ; all are markedly sessile in character. No villi can be seen. The bladder itself is dilated but not hypertrophied ; its capacity is 550 c.cm. There is no enlargement of the prostate. The comparison of the aerocystographic findings with the history of the case from which Fig. VII. was taken is instructive.

CASE 3.—Age 55 years. Admitted to the North Staffordshire Royal Infirmary with a two years' history of recurrent hæmaturia in the form of small clots at the end of micturition. The hæmaturia was painless. During the periods of freedom there was a constant perineal pain, with scalding pain at the end of the urethra during micturition. There was occasional pain down the left leg, no frequency or retention, but much loss of weight. He was a poorly nourished man. The skin was dry and grey, and there was a definite uræmic odour about him. The tongue was dry and coated white. The abdomen showed no distension of the bladder. There was no palpable enlargement of the kidneys. Per rectum the posterior lobe of the prostate was slightly enlarged and smooth. It was not nodular, and there was no vesiculitis or vesicular enlargement. The prostate was not tender. There was no fixation of the mucosa of the rectum, and the consistency of the prostate was soft and elastic. The specific gravity of the urine was 1016, albumin + +, polymorphs + +, triple phosphates + +, nil on culture. The blood-urea was 37 mg. per 100 c.cm. The blood count showed 3,350,000 red blood-cells, 11,000 white cells ; hæmoglobin, 64 per cent. ; polymorphs, 82 per cent. ; transitional and mononuclears, 5 per cent. ; lymphocytes, 12 per cent. ; eosinophils, 1 per cent. ; anisocytosis +.

Suprapubic cystostomy was performed under spinal stovaine and the aerocystographic findings were amply confirmed. These are represented in Fig. VII.A. Two large papilliferous nodules were discovered in the base of the bladder, one about 4 × 3 cm., the other 3 × 3 cm., the larger being above the smaller and to the right. There are also three smaller nodules, each 1 × 1 cm., as shown. Note the relationship of these growths to the ureteric orifices. A section of one of the growths was taken for biopsy, the pathological report being: "Section shows flattened papillomatous projection. No malignant signs found." In spite of this it was decided to treat the condition as clinically malignant. The choice, of course, lies between cystectomy and radium.

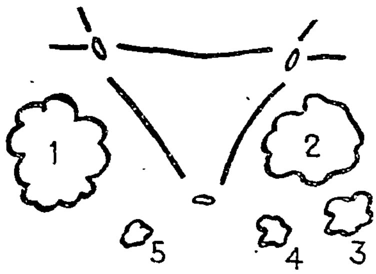

FIG. VII.A.—Diagram illustrating Fig. VII. (see text).

MEDIAN BAR FORMATION

In dealing with this condition in my previous paper I wrote :—

> "We are all familiar with the case of the man who has an unmistakably enlarged prostate when examined per rectum but, on opening the bladder, is found to have either no intravesical enlargement or very little enlargement, but nevertheless has a contracture at the neck of the bladder which is responsible for his symptoms. This is the so-called 'prostatic bar obstruction,' 'contracture of the neck of the bladder,' or 'prostatisme sans prostate.'"

Median bar formation is a definite pathological entity about which much has been written in America during the past 15 years, but which has received scant recognition in British journals. Nevertheless, in approximately 10 per cent. of cases of prostatic disease the symptoms of "prostatism" are associated not with a median lobe hypertrophy but with an atrophy of the gland tissue. Rectal examination in these cases as a rule gives no information except an undue firmness in consistency. Cystoscopy and aerocystography alone will establish the pre-operative diagnosis.

Young and Randall did much to simplify the pathology of this condition. Randall at autopsy examined the bladders of 300 men of ages 10–80 years, and discovered 54 cases of prostatic bar. In 18 of these cases (6 per cent. of prostates examined) the bars were very definite ; in the other 36 (12 per cent.) they were very small. In the large majority of cases the usual lesion consists of a thickening of the median portion of the prostate posterior to the internal sphincter, and takes the form of a definite bar rising up beneath the mucous membrane of the trigone. The mucous membrane is normal, but beneath it there is an extensive fibrosis and, deeper down, glandular tissue (ducts and acini) in a state of chronic inflammation. Occasionally there is a true prostatic hyperplasia. Sometimes the bar consists mainly of smooth muscle, in others it is thin and leaf-like (Mercier's valve). Young describes the bar as follows :—

> "There is usually a slight depression or sulcus on each side of the median bar between it and the lateral margins of the prostate, but in some cases the contour is continuous and the lateral margins of the prostate take part in the fibrosis, so that the condition is a circular fibrotic construction of the vesical orifice ; in such cases the term 'contracture of the vesical neck' is quite appropriate. At times one sees a definite bar or valve anterior to the urethra. It is usually less pronounced than the posterior bar, but in rare cases may be more pronounced and sometimes be responsible for most of the obstruction."

In a good many cases there is a history of obstruction from infancy. Always with median bar formation there is a coincident infectious process, pointing to chronic prostatitis as the probable underlying cause. About one-third of the patients give a history of previous gonorrhœa.

Median bars may be classified as :—

(1) *Fibrous.*—Divided into two types: (*a*) urethral; (*b*) trigonal.

(2) *Glandular.*—Divided into two types: (*a*) hypertrophy confined to the posterior prostatic commissure under the sphincter, producing a thick broad bar ; (*b*) arising from the subcervical glands of Albarran and lying within the sphincteric ring, forming a small prostatic lobule. Occasionally a large intravesical lobe is formed.

The tissue removed by punch operations shows microscopically a round-cell infiltration in 35 per cent. of cases, a chronic fibrosis in 12 per cent., and muscular hyperplasia in 1·7 per cent. (Young.) All are inflammatory with the exception of a small group of congenital cases (2 per cent.). The lesion consists largely of peri- and intra-acinous infiltration with round cells and occasionally cystic dilatation and intra-acinous epithelial growth similar to that seen in hyperplasia of the prostate. The inflammatory infiltration may invade the musculature quite distant from the mucosa and may eventually replace the muscle by fibrosis.

The diagnosis of these cases is based on a history similar in most respects to that of a typical "enlarged prostate," although sexual symptoms are negligible. There is difficulty and frequency of micturition. Per rectum, however, all that can be felt is a small indurated prostate which gives no help, and identification must rely on a cystoscopic examination or on the aerocystogram. I have given above the conditions which may prevent cystoscopic examination (cystitis very frequently complicates this condition), although it must be admitted that with a small meatal glandular bar cystoscopy is of more value, as it could quite easily be missed in an aerocystogram ; further, the catheter might obscure the visibility at the meatus. The radiograms of two prostatic bars are shown, and these are both of the fibrous trigonal type (Figs. IV. and V.). Fig. IV. has already been described. The following is the case-history relating to Fig. V. :—

CASE 4.—Aged 76. Admitted to hospital with a twelve months' history of frequency of micturition, both diurnal and nocturnal (5–6 times during the night). For a week before admission the difficulty had gradually increased, and on each occasion he had passed less and less urine. Every time he micturated he felt that he had not completed the act and emptied the bladder. In other words, he was suffering from the symptoms of prostatism. There was no history of hæmaturia, no drowsiness, headache, or pain in the back, no sexual neurosis, no loss of weight. The bowels were constipated. On examination he was a well-nourished man ; the skin was not dry, but the tongue was dry and coated brown. The abdomen showed no distension of the bladder. There was no tenderness over the costo-vertebral angles and no palpable renal enlargement. Per rectum the posterior lobe of the prostate was only slightly enlarged ; it was indurated but not nodular, and the median groove was well-defined. There was no fixation to the rectal mucous membrane, and no tenderness or fluctuation. The seminal vesicles were not palpably enlarged or tender. The specific gravity of the urine was

1012; albumin +; phosphates +. Blood-urea, 60 mg. per 100 c.cm. MacLean's urea-concentration test showed a maximum concentration of 2·25 per cent. and a minimum concentration of 0·33 per cent.

Clinically, one would have thought a diagnosis of intravesical enlargement of the prostate was fairly obvious—i.e., apart from the absence of marked palpable enlargement per rectum. The aerocystogram was taken as a routine, and with a most interesting result, for it showed a condition which could not have been diagnosed in any other way apart from cystoscopy. Owing to the comparative infrequency of prostatic bars the result was also somewhat of a surprise. The interpretation of this aerocystogram is very easy. The bladder is small, being in "systole" (capacity 150 c.cm.); the wall is not hypertrophied but is mottled from chronic cystitis. No intravesical enlargement of the prostate is made out, but an unmistakable trigonal bar is visible. Its height is about one-ninth that of the bladder as shown in the film, and it lies in the *internal trigone*. *The upper margin is straight and runs from side to side behind the meatus.* The diagnosis is made at a glance, for no other condition can possibly be mistaken for it. Suprapubic cystostomy confirmed the diagnosis. In Fig. IV. and exactly similar condition is seen.

Transurethral surgery, of which we have heard so much recently in this country, was initially introduced for the treatment of median bar obstruction. Young advised a punch, Geraghty a sphincterotome, and Braasch a median bar excisor. With the advent of the high-frequency cutting current, Collings and Wapplers invented for this purpose an electrode which could be used through a direct cystoscope. This instrument has also been used for the division of the dense adhesions which occasionally follow prostatectomy.

SUMMARY AND CONCLUSIONS

(1) The value of aerocystography as an aid to diagnosis of intravesical enlargement of the prostate is confirmed. The disadvantages of cystoscopy in certain cases are reiterated, and the simplicity of the air-in-bladder technique noted.

(2) The interpretation of a prostatic shadow is clarified, and the ease with which distinction between simple and malignant prostates may be made is especially emphasised.

(3) New growths of the bladder are also visualised by this procedure, and an attempt is made to correlate the aerocystographic appearances (corresponding to the morbid anatomy) with the histological anatomy of these neoplasms.

(4) Reference is made to "median bar" formation, and diagnosis by [illegible] in certain types (trigonal bars) is [illegible] meatal bar cystoscopy is a preferable means of diagnosis. The existence of median bars should be more widely known; hence the full description I have given of them. I acknowledge much indebtedness in this matter to the writings of Young and Randall, whom I have quoted freely. This very interesting pathological entity has been elucidated by their work.

(5) Finally, I might add the disappointment we feel that this most valuable adjunct to diagnosis is not more widely known and used. During the 18 months that this diagnostic method has been in use at the North Staffordshire Royal Infirmary it has not failed to help us in a single instance where any of the conditions described above has been present. Exploration of the bladder has always been deferred until the preliminary aerocystographic reading has been made; the justification of a standard routine in its employment has been definitely established.

My sincere thanks are due to Mr. T. H. Richmond and Mr. F. W. Duthie, hon. surgeons at the North Staffordshire Royal Infirmary, for their permission to publish this work. The material has been abstracted from patients under their care in the hospital, and their assistance and advice has been invaluable; to Dr. J. F. Bromley, hon. radiologist, I also owe a debt of gratitude for his radiographic help; and to Sister Jones for her patience and stimulating enthusiasm.

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LEGENDS TO ILLUSTRATIONS ON PLATE

DR. ROSS

(*Radiograms by* Dr. J. F. BROMLEY)

FIG. II.—Benign intravesical enlargement of the prostate. Note the hypertrophy and crenation of the bladder wall and the well-marked projection that the median lobe of the prostate makes. The *bladder musculature* is passing from the stage of systole to diastole.

FIG. III.—Malignant prostate. Note the irregularity of the shadow and the marked distension of the bladder wall, which is also very atrophied. There is a well-marked phlebolith to the left of the prostatic shadow. See text for full description.

FIG. IV.—Aerocystogram showing a combination of (*a*) simple papilloma of the bladder, indicated by arrow on right; (*b*) median lobe hypertrophy of the prostate; and (*c*) median bar formation. See text for full description.

FIG. V.—Fibrous trigonal bar formation. The bladder wall is hypertrophied and fasciculated, and in systole. The fluffiness of the interior of the bladder is due to chronic cystitis with alkaline incrustation.

FIG. VI.—Fairly well-marked benign hypertrophy of the prostate with multiple calculus formation. Note the very distended bladder. The fundus has been pushed over to the right, probably by the sigmoid colon.

FIG. VII.—Carcinomatosis of the bladder. Note the irregular masses which are obscuring the base. The bladder is much distended. See text and diagrammatic representation for full details.

DRS. RODGERS, PECK, AND JUPE

FIG. I.—Radiogram showing the leg bones of a child under treatment for tuberculous disease, taken for comparison. At the ends of the bones lines of temporary cessation of growth due to illness show as slightly denser areas, but are easily distinguished from deposits of lead.

FIG. II.—Patient at the time of admission, showing dense "lead lines" at the growing ends of the bones of the leg.

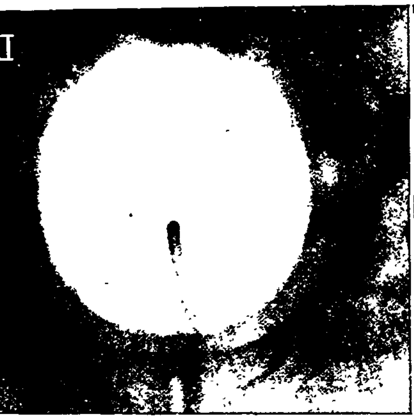
FIG. III.—Patient five months after admission, showing normal bone laid down to the epiphyseal side of the lead lines.

FIG. IV.—Lead lines in bones of forearm on admission.

DRS. PLATT AND OWEN

FIG II.—Radiogram showing rickety changes in bones of forearm, with calcification of arteries.

DR. ROSS: AEROCYSTOGRAPHY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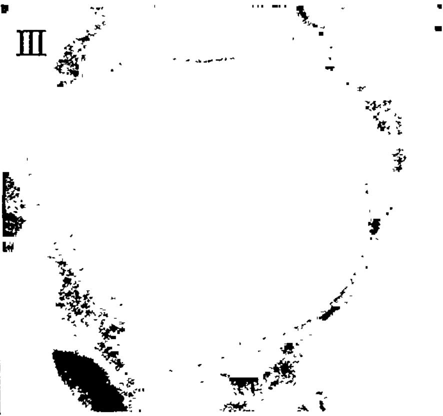
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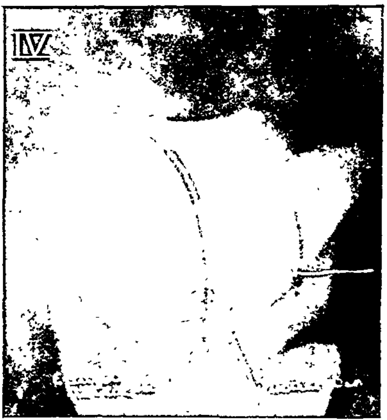
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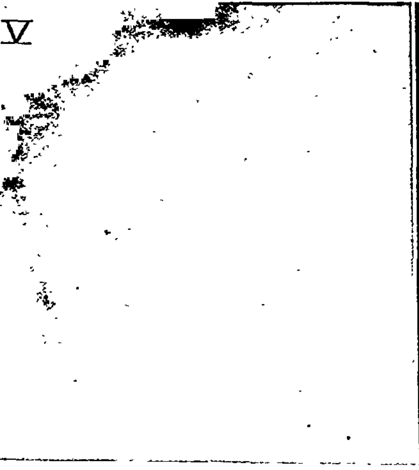
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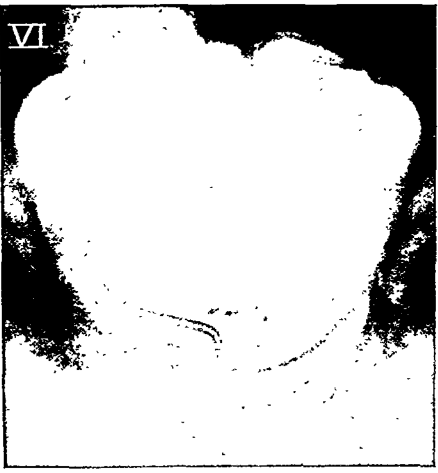
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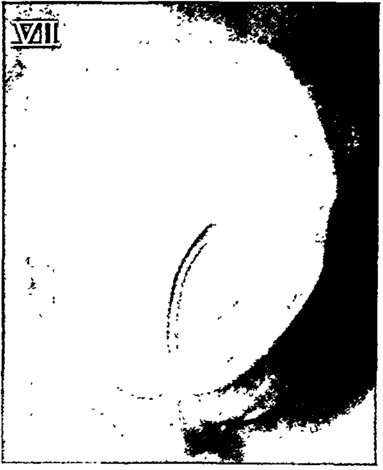
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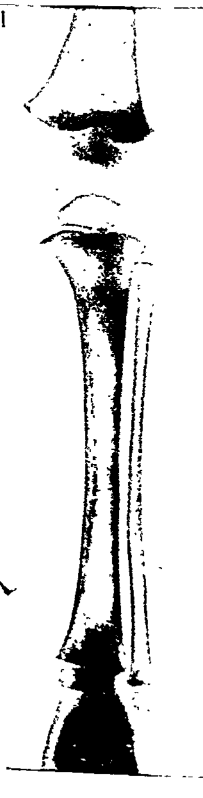
DRS. RODGERS, PECK, AND JUPE: LEAD POISONING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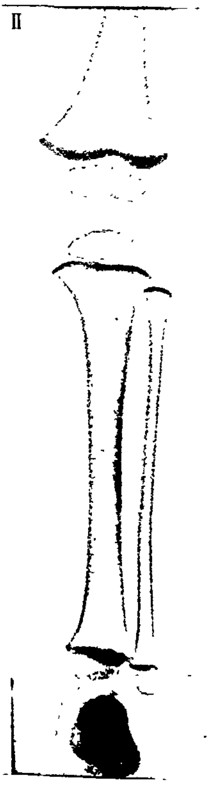
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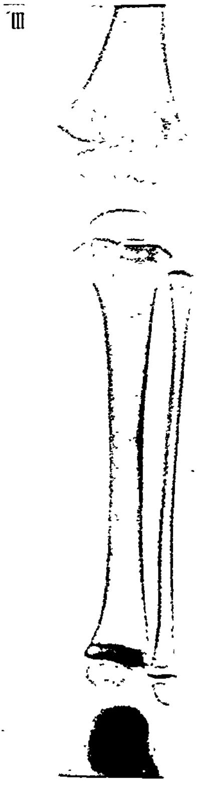
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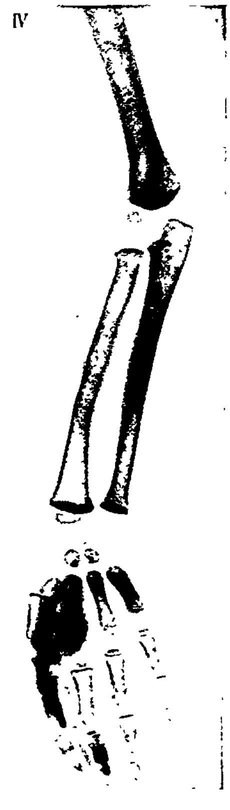
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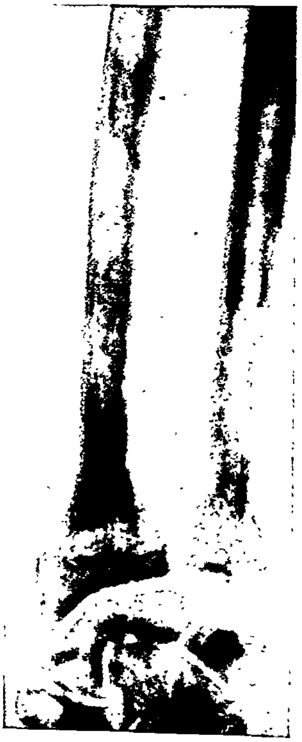
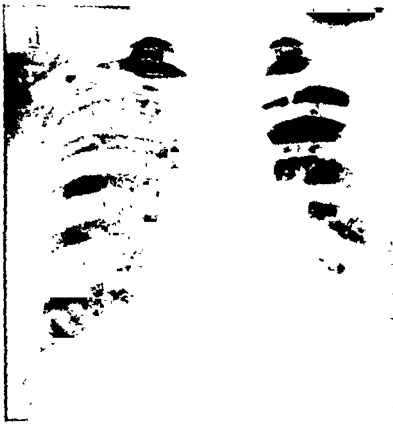
DRS. PLATT & OWEN: RENAL DWARFISM

II



DR. WILSON: BILATERAL SPONTANEOUS PNEUMOTHORAX



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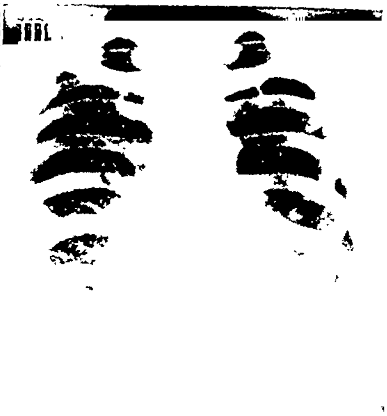

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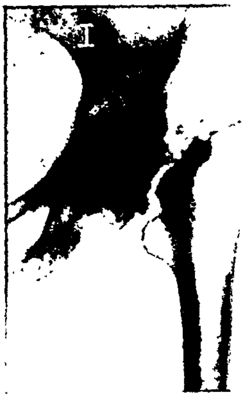
MR. McFARLAND: FRACTURES OF NECK OF FEMUR



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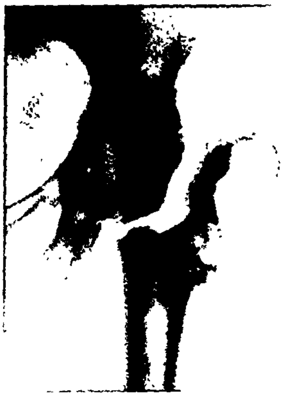

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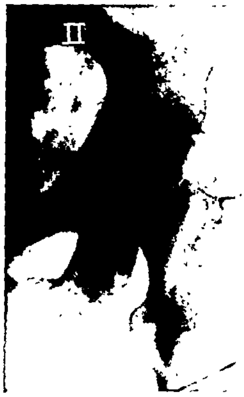

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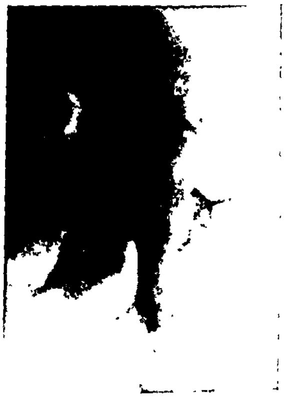

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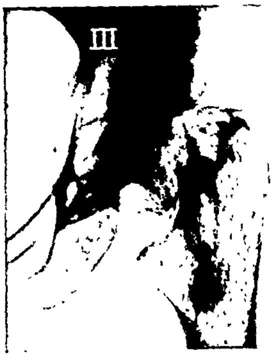

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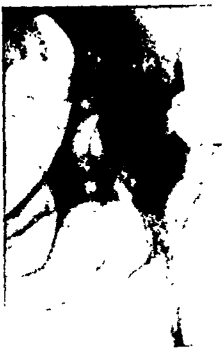

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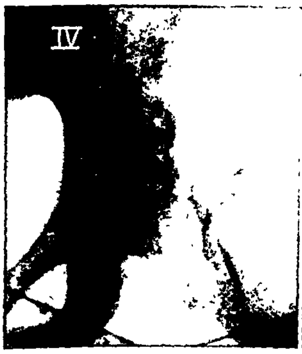

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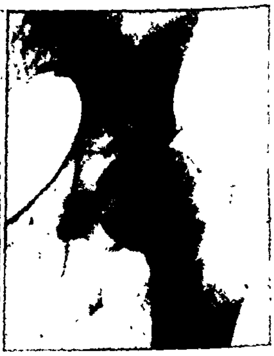

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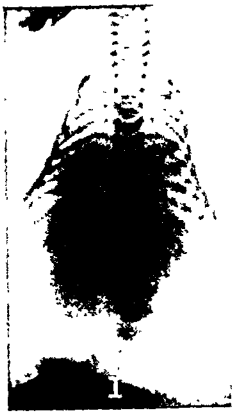
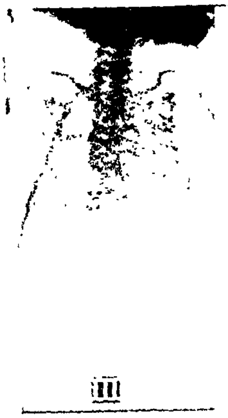
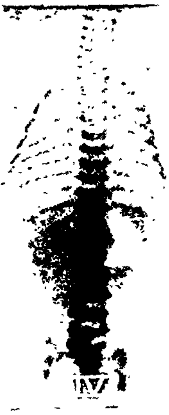
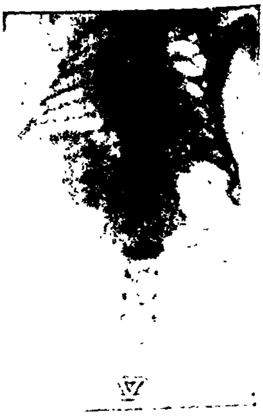
DR. HAJKIS: RADIOGRAPHIC EVIDENCE OF LIVE BIRTH









LEAD POISONING IN CHILDREN

WITH A CASE RECORD

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(WITH ILLUSTRATIONS ON PLATE)

The importance of radiography in the diagnosis of lead poisoning in children is illustrated here by a case report, and a brief outline is given of the effects of lead on the body and the clinical aspects of poisoning in children.

Lead poisoning has been known since Hippocrates described a case of lead colic in an extractor of metals some 300 years before the birth of Christ. Cases of poisoning due to contaminated wine have occurred in France for 400 years, and in the early part of the eighteenth century an epidemic of poisoning due to lead used in the storage of cider occurred in Devonshire. In 1839 was published by Tanquerel des Planches the first complete clinical description of lead poisoning based on over 1000 cases, and recently our knowledge of the metabolism of lead has been enriched by the researches of Aub and his associates in America. During the last 25 years, owing to the improvement in industrial hygienic conditions, there has been a great decrease in the incidence of this, the most common, form of industrial poisoning.

White lead, used in the making of face powder, has been a source of poisoning among nurslings in Japan for over two centuries, and, although a form of serous meningitis was recognised in 1901 by Hirota [1] as a definite clinical entity, it was not until 1923 that I. Hirai [2] found the cause to be lead. In Queensland, Australia, the lead used in painting verandah railings is readily powdered by the hot dry atmosphere and has been reported as a cause of many cases of poisoning in children, since Gibson, Turner,[3] and others drew attention to this danger some forty years ago. Now, since the use of lead-containing paints has been limited by law, the incidence of poisoning has been reduced considerably.

In America the first case of lead meningitis to be described was published by Blackfan and Thomas [4] in 1914, and this was followed shortly afterwards by further reports from Strong,[5] Norton,[6] Holt,[7] and others. Since then lead poisoning among children has been recognised with increasing frequency, and in the decennial period 1924–1933 no less than 89 cases have been seen in the Boston Children's Hospitals (McKhann and Vogt [8]). The radiographic changes found in the long bones and described by Park [9] in 1930 have made diagnosis easier and more certain, and no doubt account in part for this increase. John Thompson [10] published in 1925 an article entitled "Peculiar fatal convulsions in four children whose father suffered from lead poisoning." He considered them cases of congenital lead poisoning but there was not sufficient evidence for a definite diagnosis to be made, and plumbism in the child from paternal poisoning is no longer considered a possibility. We have found no other reference to lead poisoning in children in the English literature since 1890, and the case here recorded is the first diagnosed in the wards of the London Hospital. It may be that lead poisoning is not really so rare among children in England but merely that it is overlooked.

Apart from industry, lead poisoning occurs more commonly in children than among adults for three reasons. The young child frequently conveys to his mouth anything he can get hold of, and of the 89 cases mentioned above 72 were between the ages of one and three years. Also pica, or perverted appetite, whether from mental deficiency, ill-health, or habit, has been noticed in many of these cases (Ruddock [11]). Again, children are very liable to suffer from acidosis, and this may precipitate toxic manifestations in a case of latent poisoning. Further, it has been proved experimentally in animals that the young are very susceptible to lead, and in a recent epidemic of poisoning in Boston due to the burning of storage battery cases as fuel, of the 40 cases only 3 were adults although adults and children were equally exposed to the lead fumes (B. Williams et al.[12]).

Lead paint from furniture, woodwork, or toys has been the commonest source of poisoning, and in America, owing to the number of cases of poisoning from this origin, it is no longer used in the manufacture of cribs and the better-class toys. Toys made of lead have not been mentioned as a cause of poisoning, rather unexpectedly, considering how common such toys are. They were the probable source of poisoning

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LEGENDS TO ILLUSTRATIONS ON PLATE

DR. WILSON

FIG. I.—*Right:* Deep-seated disease which gradually becomes thinner towards lung surface. Spontaneous pneumothorax, shown along the whole of the outer surface of the lung, regular in outline. No fluid in pleural space. *Left:* Peribronchial thickening and fine nodular disease. *Heart:* Slightly to the left.

FIG. II.—*Right:* No sign of spontaneous pneumothorax. *Left:* Almost complete collapse of lung due to spontaneous pneumothorax. Note the two lobes and the absence of pleural or interlobar adhesions. *Heart:* Normally situated.

FIG. III.—Left pneumothorax again developing but not causing complete collapse.

MR. MCFARLAND

FIG. I.—Old ununited fracture treated by modified Lorenz osteotomy and immobilisation.

FIG. II.—Impacted fracture treated by immobilisation.

FIG. III. (Case 4).—Subcapital fracture treated by accurate apposition and immobilisation.

FIG. IV. (Case 5).—Subcapital fracture treated as described above

DR. HAJKIS

FIG. I.—Radiogram of stillborn child. Complete atelectasis. No air in intestinal tract.

FIG. II.—Air in stomach and intestines after five minutes of life. Heart beat for five minutes, and the child made three respiratory efforts. (Spontaneous vertex delivery, but mother had lobar pneumonia.) Routine treatment for asphyxia included Marshall Hall and Byrd's methods and mouth-to-mouth insufflation. Radiogram shows aeration of the margins of the lungs but atelectasis elsewhere.

FIG. III.—Five hours alive. Aeration of right apex and margins, atelectasis elsewhere. No insufflation. Air in stomach and intestines.

FIG. IV.—Stillborn child. Radiogram taken 72 hours after insufflation. Air in stomach only.

FIG. V.—Lungs expanded but less translucent than normal. No insufflation. Air in stomach and intestines.

in our case. Lead foil, food contaminated from kitchen utensils, or water from lead pipes are other less frequent sources. Lead-containing ointments, lotions, plasters, and dusting powders applied to the breasts, and lead nipple shields have caused poisoning in breast-fed infants. In Manchuria lead meningitis was said to be the fourth most common of all causes of death, and the origin of the poisoning was the toilet powder used by the mother (Suzuki and Kaneko[13]). Lead carbonate forms an opaque base, spreads smoothly, and, being cheap, was often used for the inferior grades of powder.

Lead absorbed by the respiratory tract gives rise to rapid and severe poisoning, and has especially to be guarded against in industry. Among children almost all cases have been due to absorption by the intestinal tract, and, though absorption through the skin is possible, it is slow and of little practical importance.

ACTION OF THE POISON

It is probable that lead is conveyed in the blood as colloidal lead phosphate which at the normal pH of the blood is very stable but by slight changes in the reaction, especially towards acidity, is easily converted into the more soluble di-lead salt. In cases of latent poisoning this probably accounts for the sudden development of toxic symptoms during an acidosis induced, for example, by an infection, as in the case described here, or by attempts at "de-leading" the patient. During absorption lead is found distributed throughout the body, but when absorption has ceased, and when there is no symptom of poisoning, it is found mainly in the bones as tertiary lead phosphate and sometimes in the keratin-containing substances, nail and hair (K. Kato[14]). Lead stored in the bones is apparently harmless. Aub[15] has shown that the metabolism of lead and calcium in the body is similar, and on this basis rests the modern treatment of lead poisoning. Factors favouring the storage of calcium in the bones, such as vitamin D and an adequate and balanced phosphorus-calcium intake, will also aid the deposition of lead, and so will be of use in the acute phases of poisoning when lead is widely distributed. In latent poisoning when attempts are made to rid the body of lead, those measures which cause an increased excretion of calcium may be used; of these Aub and Hunter[16] have shown that Parathormone is the most potent, and the liberation of comparatively large amounts of lead by this means, for some unexplained reason, is not accompanied by signs of poisoning. This action of parathormone, however, is found only on the first injection, a second injection causing no further excretion of lead. Acids or acid-forming salts will cause an excretion of lead, which is increased by giving a low calcium diet, while alkalis and potassium iodide have a similar though less pronounced effect without the need of a special diet. Shelling[17] has shown that magnesium hinders calcification and therefore, probably, the deposition of lead, for which reason it should not be given parenterally to cases presenting symptoms of acute poisoning.

Lead is excreted mainly by the bowel and to a less extent by the kidneys; the gall-bladder is also probably concerned in its excretion but only to a slight extent. Lead found in the fæces may have passed through the intestinal tract unchanged, but lead found in the urine proves absorption, and is therefore of great diagnostic importance.

That anæmia is associated with lead poisoning was noted by Laennec in 1831; stippling was described by Ehrlich in 1885, and its relation to plumbism demonstrated by Behrend in 1899, but the mechanism of this change has only recently been made known. Lead changes the colloidal state of the cell surface by a deposition of insoluble lead phosphate and a local production of acid; this causes a shrinkage and hardening of the cell wall which, while making it more resistant to changes in osmotic pressure, makes the cell more brittle and less sticky. The effects of these changes are seen in the resistance of "leaded" cells to low concentrations of saline, and the absence of agglutination frequently found with sera of the various agglutinating groups. The brittle cells, unable to withstand the trauma inflicted in circulation, are readily destroyed, and so is produced a hæmolytic anæmia. To this is due the increase of pigment in the blood, bile, and urine which is sometimes found, and the compensatory erythroblastic reaction in the marrow, evidence of which may be found clinically in the high reticulocyte count of the blood. Lead, always prone to attack the young cells, produces in these reticulocytes a clumping of the basophilic substance of the cytoplasm to which the appearance of stippling is due.

The blue line of the gums is due to a subepithelial deposit of lead sulphide. The circulating tertiary lead phosphate is converted locally into the very soluble di-lead salt by slight changes in the reaction of the tissues, and this combines readily with hydrogen sulphide which diffuses through the gums, being formed from the decaying protein of food material left in the crevices between the teeth. The lead line, as would be expected, is rarely seen when the teeth are kept clean, and is not found in the herbivora.

The damaging effect of lead on the germ cell is well known, producing abortion or weakly offspring. Lead colic is due to its action on smooth muscle. In vitro there is an inhibition of motility and an increase of tone, which explains the constant association of colic and constipation. The primary changes in lead palsy are now known to be in the muscle, such changes as are found in the cord and peripheral nerves probably being the result of paralysis of the muscles supplied. Lead, circulating as insoluble colloidal phosphate, meets the lactic acid of fatigued muscle and is precipitated on the cell surface as lead phosphate by reacting with the inorganic buffer phosphate of the cell; this changes the properties of the cell surface and leads to lead palsy. It has long been known that the muscles most used are those most often paralysed.

In lead meningo-encephalopathy the most important change is an intense cerebral œdema which explains all the symptoms of depression and excitation of the brain found in these cases, and may lead to death from medullary compression, or the ischæmia produced may later result in extensive cerebral atrophy, demonstrated by McKhann in one case by means of an encephalogram two years after the onset of poisoning. This cerebral atrophy is the cause of such nervous sequelæ as mental deficiency, paralyses, and spontaneous movements. In many cases there is evidence of a sterile meningitis in the neck rigidity and increase of cells in the cerebro-spinal fluid, and a proliferative meningitis has been demonstrated post mortem. The cerebro-spinal fluid is under increased pressure, and there is a moderate increase of the total protein. The cell count is nearly always raised, from 20–100 cells per c.mm., but it may be normal.

THE CLINICAL RESULTS

Acute poisoning due to the rapid absorption of large amounts of lead is rare and the symptoms mainly gastro-intestinal, to which are often added signs of cerebral disturbance such as are found in the encephalopathy of *chronic poisoning* (D. D. Stewart[18]). Other of the toxic episodes of chronic poisoning may occur, and an acute hæmolytic anæmia of varying severity has been found in some cases.

The repeated ingestion of small amounts of lead may produce signs of absorption such as a "blue line" on the gums, and changes in the radiological appearance of the long bones, without producing any signs of intoxication. This state of latent poisoning is found more often among adults than in children, the young being relatively more susceptible to lead. The amount of lead absorbed, the pH of the blood, and idiosyncrasy are other factors influencing intoxication.

The disturbance of health produced by chronic poisoning causes such general symptoms as constipation, vomiting, loss of appetite, and irritability, which is often extreme. These symptoms, usually insidious in onset, are found a varying period after absorption has begun. A secondary anæmia is a constant accompaniment, but punctate basophilia, though usually well marked, is not an invariable finding. It occurs in over three-quarters of the cases according to Holt.[19] Evidence of hæmolysis (hæmoglobinuria, hæmatoporphynuria, and increase of bile-pigments in the blood) and of marrow regeneration (reticulocytosis) are sometimes found. The "blue line" though an important diagnostic point is not often seen in children, and Kato reports the occasional finding of blackened teeth and nails in babies in Japan.

The toxic episodes which may occur in the course of chronic poisoning are colic, peripheral limb palsies, papillœdema and ocular palsies, and meningo-encephalopathy. It is these acute phases of intoxication, particularly encephalopathy, which are so often produced in children by an infection or other factor giving rise to an acidosis.

Colic in children is not often reported, but this may be due to its passing unrecognised and may account for the marked irritability sometimes found. Paralysis of the limbs is uncommon except in Queensland where, according to Nye, its frequent occurrence has earned for it the popular name of "the dangles." Unlike the adult, the paralyses in children are found more in the lower than in the upper limb, presumably because in children the legs are more fatigued than the arms. Pains and reflex changes may accompany the weakness.

Lockhart Gibson[20] has drawn attention to the effects of lead on the eye, and regards these conditions as common, though other writers consider them rare. Papillœdema and ocular palsy are found usually with encephalopathy, though they may occur alone. Optic atrophy sometimes results when these cases are left untreated, but the ocular palsies always recover.

Lead encephalopathy is the most serious of the acute manifestations of poisoning in children, and is common, having occurred in 45 of the 89 cases mentioned by McKhann. The symptoms caused by the acute cerebral œdema are those of a raised intracranial pressure with depression and excitation of the brain. There is headache, vomiting, papillœdema, and a bulging fontanelle with stupor or coma. There may be paralyses of the ocular or limb muscles, and the children are sometimes delirious or tremulous. Convulsions and twitching are common and have been noted to occur in groups. In many cases there are, in addition, signs of meningeal irritation such as neck rigidity and head retraction, and this may be reflected in the cerebro-spinal fluid by a pleocytosis. The fluid is always under increased pressure and the protein content is raised, but the rise in cell count is not constant. Fever which is often present is due in most cases to an accompanying infection.

The prognosis in encephalopathy is serious: of 20 cases recorded by Holt 11 died and only 1 escaped permanent cerebral damage. Mental deficiency, convulsions, blindness from optic atrophy, and cerebral palsies have all resulted from the ischæmia produced during lead encephalopathy by the acute cerebral œdema. Apart from such nervous sequelæ, little has been noted of the late effects of lead poisoning, but Nye[12] believes that in Queensland chronic interstitial nephritis in children is commonly due to lead poisoning earlier in life. Among 80 consecutive cases of chronic interstitial nephritis he found 14 patients who had been treated in childhood for lead poisoning. Another late effect he has noticed is renal dwarfism.[22] In chronic poisoning lead is not always found in the excreta, but if an injection of parathormone be given and several days supply examined a positive result is more likely. Recently Shipley has published a spectroscopic method of detecting minute amounts in the blood.[23]

RADIOGRAPHIC AND OTHER MEANS OF DIAGNOSIS

In 1930 Park, followed shortly afterwards by Vogt[24 25] and Caffey, described the radiographic changes produced by lead in the bones of children and young animals. These changes appear as a band of increased density at the diaphyseal end of the growing bone, most marked where the growth is greatest (Figs. II. and IV.). The outline of the bone is unchanged and there is no evidence of irregularity at the epiphyseal junction or of raising of the periosteum. The epiphyses are quite normal. The degree of opacity and the width of the dense band varies with the amount of lead absorbed and the length of time that the absorption has been taking place. As the bone grows, the band tends to become wider and less well defined. The density is due to the deposition of lead in the bone chiefly and also to the condensation of the traveculæ. If the absorption of lead ceases, an area of bone of normal density appears on the epiphyseal side of the "lead line" (Fig. III.). As the metal is deposited only in the growing bone the changes are not seen in adults.

Similar, but not identical, appearances are seen in scurvy, congenital syphilis,[26] Albers-Schönberg's disease ("marble bones"), and in poisoning by vitamin D and elementary phosphorus, and a few cases have been reported where other heavy metals such as strontium and bismuth have been the cause. The clinical features in these conditions are usually sufficiently distinct to avoid confusion.

In scurvy, the fact that the band of density is not wide and has a zone of rarefaction behind it should make the diagnosis clear, and the "ground-glass" appearance of the bones and, in some cases, the presence of subperiosteal hæmorrhages may be noted; in addition the deformity at the joint and the pain help to confirm the diagnosis.

In congenital syphilis the periosteum is raised in a large percentage of cases and there may be changes at the ends of the diaphyses ranging from slight irregularity to actual destruction. In this condition also there is a dense line at the end of the bone, but it is narrow and has an area of lessened density just behind it.

Albers-Schönberg's disease is rare and must be distinguished by the history and clinical methods; this also applies to poisoning by other metals. In some cases of Albers-Schönberg's disease there is widening of the end of the bone, best seen at the lower end of the femur, and the presence of this makes diagnosis more easy.

In healing rickets the dense band is not so clean-cut and not so even in width, and in most cases the "saucer-

shaped " deformity can still be traced for some time after the healing has taken place. Here again the history is of great importance and no difficulty is likely to arise.

There are three types of cases in which lead poisoning may be suspected. First may be mentioned cases of convulsions of obscure origin or cases of sterile meningitis. Rickets with convulsions and tuberculous meningitis have been most frequently mistaken for this type of case. Secondly, cases showing papillœdema, with or without ocular palsy, for which no cause can be found. And lastly anæmic children who suffer from colic, constipation, and irritability, or in whom signs of peripheral limb palsy are found.

In the diagnosis of a suspected case of poisoning a history of having ingested lead in some form is important and is usually obtained. A lead line, though uncommon, is pathognomonic of plumbism. Stippling of the red cells with a mild secondary anæmia is one of the most constant diagnostic points, but the stippling varies considerably from day to day so that repeated search may be necessary. Stippled cells occur in other conditions, but their numbers are always very small compared with those found in lead poisoning. Another useful aid to diagnosis is radiography; lead paint has been seen in the intestines by this means, showing as " fleck " shadows mixed with the intestinal contents, and the typical bone changes may be found. Lastly, the blood, urine, and fæces may be examined for lead, and although its presence cannot always be detected it is found in the majority of cases.

TREATMENT

The treatment of lead poisoning in children is mainly the treatment of lead encephalopathy. First, all sources of lead should be removed, and, as one attack of acute intoxication predisposes to others, the child should in future be guarded carefully against further risks of poisoning.

The immediate aim of treatment is the lowering of intracranial pressure to safe limits, and the first and most useful means employed is the withdrawal of cerebro-spinal fluid by lumbar puncture. The injection of hypertonic solutions, theoretically justified, seems to have proved disappointing. Despite the objection raised by Shelling to the use of magnesium salts, a 25 per cent. solution of magnesium sulphate has been injected intramuscularly up to a dose of 0·2 g. per kg., and this drug, in addition to its action as a hypertonic solution, acts as a nervous depressant by virtue of its magnesium ion, and would be of use in cases of convulsions. In animals the depressant action of magnesium can be abolished immediately by the injection of an equal concentration of calcium, an antidote which should make this a safe method of treatment. A 15 per cent. saline solution or a 25 per cent. solution of glucose in normal saline may be given intravenously in doses of about 50 c.cm. to a child of 5 years. Any of these solutions may be administered rectally and, if they are retained for over half an hour, they exert a similar though slower and less pronounced action. In cases where convulsions and delirium are prominent features, sedatives should be given in addition to the above treatment.

The next most important point in treatment is to aid the rapid deposition of lead in the bones, and to this end calcium is used and is best given by an intramuscular injection of 5 to 10 c.cm. of 10 per cent. calcium gluconate. Later calcium lactate may be given by the mouth and a diet rich in milk. Measures to prevent an acidosis include the giving of alkali and the avoidance of starvation. Recently Shipley has shown that, although the normal diet of an infant contains sufficient phosphorus for his everyday needs, when the calcium intake is suddenly increased it tends to upset the calcium-phosphorus balance and cause an increased loss of both. He has proved experimentally that the giving of phosphorus and vitamin D will prevent rats from being poisoned by doses of lead that killed others not so protected. The phosphorus and vitamin D both act by increasing the deposition of lead, as of calcium, and therefore on theoretical grounds should be given.

The removal of the source of poisoning, hygienic surroundings, and an adequate diet with added vitamin D and perhaps calcium and phosphorus are advisable.

Many attempts at de-leading patients have been made by such means as the giving of a low calcium diet, the production of an acidosis, and the use of potassium iodide or parathormone, but such attempts in children are contra-indicated because of the danger of precipitating one of the toxic episodes. It is not possible to rid the body of all lead, and as lead deposited in the bones is harmless it is best left there to be retained or to be excreted spontaneously.

A CASE-HISTORY

A boy, aged 2 years, was admitted to the London Hospital on Oct. 13th, 1933. He was said to have been well till the age of 8 months when he had an attack of broncho-pneumonia, followed a few months later by a second attack with measles. Since then he had had repeated attacks of bronchitis and sore-throat, sometimes complicated by diarrhœa and vomiting. As far as can be judged his mental condition was normal. In the last six months he had been pale and irritable and had been treated as a case of "nutritional anæmia." A blood count six months before admission showed 5,000,000 red blood-cells and 48 per cent. hæmoglobin (Dare, normal = 85 per cent.), and five months later, despite iron therapy, the red blood-cells and hæmoglobin had fallen to 4,000,000 and 40 per cent. respectively. He had always been underweight, but his condition had deteriorated further during the last few months. He had become more irritable and suffered from attacks of screaming thought to be due to colic.

Some 16 hours before being brought to hospital he is said to have fallen in a fit and he was still unconscious on admission. The mother had noticed that of late he had developed a habit of eating dirt and chewing at whatever he could lay his hands on. She brought to hospital a bag of " tin soldiers," many of whom had lost their limbs and their coats of paint and were tooth-marked.

On examination he was comatose with widely dilated, non-reacting pupils and absent deep reflexes. The temperature was 101° F. and a definite tonsillitis was present. The discs and fundi appeared healthy and no abnormality was discovered in any of the other systems or in the urine. There were no signs of rickets or tetany, nor was there a " blue line " present. After a lumbar puncture the child became semi-conscious and twitching movements, which sometimes became generalised convulsions, were noted frequently during the first day. The fluid was under increased pressure but was normal apart from an increase of the total protein content to 0·09 per cent. Sedatives were given, an intramuscular injection of 5 c.cm. of 10 per cent. calcium gluconate, and 8 oz. of 20 per cent. magnesium sulphate solution rectally, but little of this last was retained. None of these measures produced any striking change in the patient's condition.

After two days of restless delirium a further series of convulsions occurred during the third day and two further lumbar punctures were performed. The child's condition then gradually improved, but he appeared to be mentally deficient and would put anything within reach into his mouth. For the first two weeks there was a mild irregular fever, but later the general condition improved and he was discharged a month after admission looking somewhat pale but otherwise fairly well apart

from his appearance of mental deficiency. He was treated after the first few days with calcium lactate, grs. 5 three times a day, and care was taken to avoid producing an acidosis.

A blood count performed three days after admission showed 5,000,000 red cells, 40 per cent. hæmoglobin (Dare), and 19,800 white blood corpuscles, 57 per cent. of which were polymorphonuclear cells. An abnormal degree of punctate basophilia was seen in later films. The fragility of the red cells was normal. No lead was found in the urine or fæces. X ray examination of the long bones showed the areas of increased density at the ends of the diaphyses, sometimes called "lead lines" (Figs. II. and IV.).

Readmission.—Five months after discharge the child was readmitted for further investigation. In this interval he had gained no weight and remained pale, but there were no abnormal physical signs apart from enlarged septic tonsils. From his aspect and behaviour it was obvious that he was mentally deficient and still suffered from pica. He had been guarded from all possible sources of lead, and had been treated with grs. 5 doses of iron and ammonium citrate and 5 minims of Radiostoleum three times a day. There had been no convulsions or colic, and no paralysis or "blue line" had appeared. A blood count still showed a considerable degree of anæmia: red cells 3,400,000, hæmoglobin 46 per cent.; no punctate basophilia. Radiography of the long bones showed that the "lead lines" were now some distance from the ends of the bones and had widened as a result of growth at the bone ends (Fig. III.).

Three intramuscular injections of 5 units parathormone (Lilly) were given over a period of four days, and the fæces collected for a week which included this period. On analysis by a *modification of Fairhall's chromate* method large amounts of lead were found.

The child was last seen on June 1st, 1934, when little change was noted in his condition.

SUMMARY

(1) A case is reported demonstrating the value of the radiological changes at the ends of the long bones as a sign of lead poisoning in children. (2) Lead is a possible source of poisoning in the home, especially that found in paint. (3) Lead is stored in the bones and while it remains there is harmless. Only during absorption and excretion do toxic symptoms appear. (4) The possibility of lead poisoning should be considered in cases of convulsions of obscure origin, of papillœdema and ocular palsy without obvious cause, and in cases of anæmia with colic or peripheral limb palsy.

Since lead is commonly found in the home within the reach of children it is surprising that more cases have not come to light, and the possibility of such cases passing unnoticed has prompted us to record this case.

We are indebted to Dr. A. G. Maitland-Jones for his permission to publish this case, and to Dr. Donald Hunter for advice and interest, and to Dr. J. R. Marrack for his skill and patience in tracing the lead excreted.

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FRACTURES OF THE NECK OF THE FEMUR

By Bryan McFarland, M.D., M.Chir. Orth. Liverp., F.R.C.S. Edin.

HON. ASSISTANT ORTHOPÆDIC SURGEON TO THE ROYAL SOUTHERN HOSPITAL AND THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL

(WITH ILLUSTRATIONS ON PLATE)

In three years 24 cases have been treated. They fall into three main groups: old fractures and recent fractures either low or high in the neck.

(1) *Old fractures* with absorption of the neck and established non-union. (5 cases). It is usually impracticable to obtain union, and in these cases a modified Lorenz osteotomy was performed followed by immobilisation in plaster-of-Paris from six to eight weeks. In one case only a fair functional result was obtained, but in 4 the result was very good. Fig. I. shows radiograms of one of these. The patient, aged 49 years, weighed 12 st.; she walked within three months of the operation and now walks with equal shoes and has no limp. There is three-quarters of an inch shortening; two-thirds of normal abduction of the hip; rotation is about half of normal; flexion is three-quarters of normal. She has no pain and can walk two miles easily and balances firmly on the injured leg.

(2) *Recent fractures low in the neck.*—In this series there were 6 cases. As is usual in fractures high in the neck, bony union was obtained in the cases treated. Two patients were not fit to stand active treatment. Of these one walks with support, the other died of myocardial degeneration, fibrillation, and exophthalmic goitre, all of which existed before the fracture.

(3) *Recent fractures high in the neck* (subcapital fracture).—Of 13 cases 4 were not considered suitable for treatment. This decision was arrived at only after consultation with physicians and anæsthetists. In such cases it is necessary to forego the chance of union in order to keep the patients alive. This does not mean that they must be condemned to lie in bed indefinitely. After a few days they can be induced to walk in a bucket-top calliper. Of the 4 patients considered unfit, 3 are walking with supports; 1 died some months after the fracture on account of septic absorption from a wound of the other leg. In 2 of the 9 remaining high cases there was impaction, and contrary to what has usually been advised, these fractures were not disimpacted; because they were in a sufficiently good position and the patients were aged 59 and 50 respectively. No anæsthetic was given, plaster-of-Paris was firmly applied, and immobilisation was continued for two and a half to

shaped " deformity can still be traced for some time after the healing has taken place. Here again the history is of great importance and no difficulty is likely to arise.

There are three types of cases in which lead poisoning may be suspected. First may be mentioned cases of convulsions of obscure origin or cases of sterile meningitis. Rickets with convulsions and tuberculous meningitis have been most frequently mistaken for this type of case. Secondly, cases showing papillœdema, with or without ocular palsy, for which no cause can be found. And lastly anæmic children who suffer from colic, constipation, and irritability, or in whom signs of peripheral limb palsy are found.

In the diagnosis of a suspected case of poisoning a history of having ingested lead in some form is important and is usually obtained. A lead line, though uncommon, is pathognomonic of plumbism. Stippling of the red cells with a mild secondary anæmia is one of the most constant diagnostic points, but the stippling varies considerably from day to day so that repeated search may be necessary. Stippled cells occur in other conditions, but their numbers are always very small compared with those found in lead poisoning. Another useful aid to diagnosis is radiography; lead paint has been seen in the intestines by this means, showing as "fleck" shadows mixed with the intestinal contents, and the typical bone changes may be found. Lastly, the blood, urine, and fæces may be examined for lead, and although its presence cannot always be detected it is found in the majority of cases.

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The immediate aim of treatment is the lowering of intracranial pressure to safe limits, and the first and most useful means employed is the withdrawal of cerebro-spinal fluid by lumbar puncture. The injection of hypertonic solutions, theoretically justified, seems to have proved disappointing. Despite the objection raised by Shelling to the use of magnesium salts, a 25 per cent. solution of magnesium sulphate has been injected intramuscularly up to a dose of 0·2 g. per kg., and this drug, in addition to its action as a hypertonic solution, acts as a nervous depressant by virtue of its magnesium ion, and would be of use in cases of convulsions. In animals the depressant action of magnesium can be abolished immediately by the injection of an equal concentration of calcium, an antidote which should make this a safe method of treatment. A 15 per cent. saline solution or a 25 per cent. solution of glucose in normal saline may be given intravenously in doses of about 50 c.cm. to a child of 5 years. Any of these solutions may be administered rectally and, if they are retained for over half an hour, they exert a similar though slower and less pronounced action. In cases where convulsions and delirium are prominent features, sedatives should be given in addition to the above treatment.

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On examination he was comatose with widely dilated, non-reacting pupils and absent deep reflexes. The temperature was 101° F. and a definite tonsillitis was present. The discs and fundi appeared healthy and no abnormality was discovered in any of the other systems or in the urine. There were no signs of rickets or tetany, nor was there a "blue line" present. After a lumbar puncture the child became semi-conscious and twitching movements, which sometimes became generalised convulsions, were noted frequently during the first day. The fluid was under increased pressure but was normal apart from an increase of the total protein content to 0·09 per cent. Sedatives were given, an intramuscular injection of 5 c.cm. of 10 per cent. calcium gluconate, and 8 oz. of 20 per cent. magnesium sulphate solution rectally, but little of this last was retained. None of these measures produced any striking change in the patient's condition.

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from his appearance of mental deficiency. He was treated after the first few days with calcium lactate, grs. 5 three times a day, and care was taken to avoid producing an acidosis.

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The child was last seen on June 1st, 1934, when little change was noted in his condition.

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(1) A case is reported demonstrating the value of the radiological changes at the ends of the long bones as a sign of lead poisoning in children. (2) Lead is a possible source of poisoning in the home, especially that found in paint. (3) Lead is stored in the bones and while it remains there is harmless. Only during absorption and excretion do toxic symptoms appear. (4) The possibility of lead poisoning should be considered in cases of convulsions of obscure origin, of papillœdema and ocular palsy without obvious cause, and in cases of anæmia with colic or peripheral limb palsy.

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FRACTURES OF THE NECK OF THE FEMUR

By Bryan McFarland, M.D., M.Chir. Orth. Liverp., F.R.C.S. Edin.

HON. ASSISTANT ORTHOPÆDIC SURGEON TO THE ROYAL SOUTHERN HOSPITAL AND THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL

(WITH ILLUSTRATIONS ON PLATE)

In three years 24 cases have been treated. They fall into three main groups: old fractures and recent fractures either low or high in the neck.

(1) *Old fractures* with absorption of the neck and established non-union. (5 cases). It is usually impracticable to obtain union, and in these cases a modified Lorenz osteotomy was performed followed by immobilisation in plaster-of-Paris from six to eight weeks. In one case only a fair functional result was obtained, but in 4 the result was very good. Fig. I. shows radiograms of one of these. The patient, aged 49 years, weighed 12 st.; she walked within three months of the operation and now walks with equal shoes and has no limp. There is three-quarters of an inch shortening; two-thirds of normal abduction of the hip; rotation is about half of normal; flexion is three-quarters of normal. She has no pain and can walk two miles easily and balances firmly on the injured leg.

(2) *Recent fractures low in the neck.*—In this series there were 6 cases. As is usual in fractures high in the neck, bony union was obtained in the cases treated. Two patients were not fit to stand active treatment. Of these one walks with support, the other died of myocardial degeneration, fibrillation, and exophthalmic goitre, all of which existed before the fracture.

(3) *Recent fractures high in the neck* (subcapital fracture).—Of 13 cases 4 were not considered suitable for treatment. This decision was arrived at only after consultation with physicians and anæsthetists. In such cases it is necessary to forego the chance of union in order to keep the patients alive. This does not mean that they must be condemned to lie in bed indefinitely. After a few days they can be induced to walk in a bucket-top calliper. Of the 4 patients considered unfit, 3 are walking with supports; 1 died some months after the fracture on account of septic absorption from a wound of the other leg. In 2 of the 9 remaining high cases there was impaction, and contrary to what has usually been advised, these fractures were not disimpacted; because they were in a sufficiently good position and the patients were aged 59 and 50 respectively. No anæsthetic was given, plaster-of-Paris was firmly applied, and immobilisation was continued for two and a half to

shaped " deformity can still be traced for some time after the healing has taken place. Here again the history is of great importance and no difficulty is likely to arise.

There are three types of cases in which lead poisoning may be suspected. First may be mentioned cases of convulsions of obscure origin or cases of sterile meningitis. Rickets with convulsions and tuberculous meningitis have been most frequently mistaken for this type of case. Secondly, cases showing papillœdema, with or without ocular palsy, for which no cause can be found. And lastly anæmic children who suffer from colic, constipation, and irritability, or in whom signs of peripheral limb palsy are found.

In the diagnosis of a suspected case of poisoning a history of having ingested lead in some form is important and is usually obtained. A lead line, though uncommon, is pathognomonic of plumbism. Stippling of the red cells with a mild secondary anæmia is one of the most constant diagnostic points, but the stippling varies considerably from day to day so that repeated search may be necessary. Stippled cells occur in other conditions, but their numbers are always very small compared with those found in lead poisoning. Another useful aid to diagnosis is radiography; lead paint has been seen in the intestines by this means, showing as "fleck" shadows mixed with the intestinal contents, and the typical bone changes may be found. Lastly, the blood, urine, and fæces may be examined for lead, and although its presence cannot always be detected it is found in the majority of cases.

TREATMENT

The treatment of lead poisoning in children is mainly the treatment of lead encephalopathy. First, all sources of lead should be removed, and, as one attack of acute intoxication predisposes to others, the child should in future be guarded carefully against further risks of poisoning.

The immediate aim of treatment is the lowering of intracranial pressure to safe limits, and the first and most useful means employed is the withdrawal of cerebro-spinal fluid by lumbar puncture. The injection of hypertonic solutions, theoretically justified, seems to have proved disappointing. Despite the objection raised by Shelling to the use of magnesium salts, a 25 per cent. solution of magnesium sulphate has been injected intramuscularly up to a dose of 0·2 g. per kg., and this drug, in addition to its action as a hypertonic solution, acts as a nervous depressant by virtue of its magnesium ion, and would be of use in cases of convulsions. In animals the depressant action of magnesium can be abolished immediately by the injection of an equal concentration of calcium, an antidote which should make this a safe method of treatment. A 15 per cent. saline solution or a 25 per cent. solution of glucose in normal saline may be given intravenously in doses of about 50 c.cm. to a child of 5 years. Any of these solutions may be administered rectally and, if they are retained for over half an hour, they exert a similar though slower and less pronounced action. In cases where convulsions and delirium are prominent features, sedatives should be given in addition to the above treatment.

The next most important point in treatment is to aid the rapid deposition of lead in the bones, and to this end calcium is used and is best given by an intramuscular injection of 5 to 10 c.cm. of 10 per cent. calcium gluconate. Later calcium lactate may be given by the mouth and a diet rich in milk. Measures to prevent an acidosis include the giving of alkali and the avoidance of starvation. Recently Shipley has shown that, although the normal diet of an infant contains sufficient phosphorus for his every-day needs, when the calcium intake is suddenly increased it tends to upset the calcium-phosphorus balance and cause an increased loss of both. He has proved experimentally that the giving of phosphorus and vitamin D will prevent rats from being poisoned by doses of lead that killed others not so protected. The phosphorus and vitamin D both act by increasing the deposition of lead, as of calcium, and therefore on theoretical grounds should be given.

The removal of the source of poisoning, hygienic surroundings, and an adequate diet with added vitamin D and perhaps calcium and phosphorus are advisable.

Many attempts at de-leading patients have been made by such means as the giving of a low calcium diet, the production of an acidosis, and the use of potassium iodide or parathormone, but such attempts in children are contra-indicated because of the danger of precipitating one of the toxic episodes. It is not possible to rid the body of all lead, and as lead deposited in the bones is harmless it is best left there to be retained or to be excreted spontaneously.

A CASE-HISTORY

A boy, aged 2 years, was admitted to the London Hospital on Oct. 13th, 1933. He was said to have been well till the age of 8 months when he had an attack of broncho-pneumonia, followed a few months later by a second attack with measles. Since then he had had repeated attacks of bronchitis and sore-throat, sometimes complicated by diarrhœa and vomiting. As far as can be judged his mental condition was normal. In the last six months he had been pale and irritable and had been treated as a case of "nutritional anæmia." A blood count six months before admission showed 5,000,000 red blood-cells and 48 per cent. hæmoglobin (Dare, normal = 85 per cent.), and five months later, despite iron therapy, the red blood-cells and hæmoglobin had fallen to 4,000,000 and 40 per cent. respectively. He had always been underweight, but his condition had deteriorated further during the last few months. He had become more irritable and suffered from attacks of screaming thought to be due to colic.

Some 16 hours before being brought to hospital he is said to have fallen in a fit and he was still unconscious on admission. The mother had noticed that of late he had developed a habit of eating dirt and chewing at whatever he could lay his hands on. She brought to hospital a bag of "tin soldiers," many of whom had lost their limbs and their coats of paint and were tooth-marked.

On examination he was comatose with widely dilated, non-reacting pupils and absent deep reflexes. The temperature was 101° F. and a definite tonsillitis was present. The discs and fundi appeared healthy and no abnormality was discovered in any of the other systems or in the urine. There were no signs of rickets or tetany, nor was there a "blue line" present. After a lumbar puncture the child became semi-conscious and twitching movements, which sometimes became generalised convulsions, were noted frequently during the first day. The fluid was under increased pressure but was normal apart from an increase of the total protein content to 0·09 per cent. Sedatives were given, an intramuscular injection of 5 c.cm. of 10 per cent. calcium gluconate, and 8 oz. of 20 per cent. magnesium sulphate solution rectally, but little of this last was retained. None of these measures produced any striking change in the patient's condition.

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three months. Bony union occurred satisfactorily (Fig. II.). Both patients are able to walk comparatively long distances, and movements are more than three-quarters of normal. It is perhaps of some interest that both these patients walked into the out-patient department. It is exactly this type of fracture which is missed and treated as rheumatism or as sciatica until non-union has commenced.

The remaining 7 fractures were subcapital and non-impacted. It is in these cases that the greatest difficulty lies. It is probable that bony union in any fracture depends upon four factors: apposition, immobilisation, blood-supply, and some chemical or hormonic influence. When the blood-supply of a fractured part is poor, immobilisation must be more accurate and more prolonged. It is therefore obvious that in subcapital fractures of the neck of the femur accurate apposition and prolonged immobilisation are of supreme importance. At the same time it is the duty of the surgeon to obtain his results in the simplest possible manner, and to remember that although union in a good position is desirable, the patient's life must not be unnecessarily endangered. The following method, which is a modification of Royal Whitman's method, will be found simple and effective.

Under general anæsthesia reduction is effected by flexing the knee, flexing the hip at a right angle, and putting the leg in slight adduction. Pressure is then applied in a forwards and downwards direction against the upper and back part of the trochanter. The fractures will be felt to crepitate and the femur will be felt to move downwards and inwards in relation to the pelvis (and therefore to the head of the femur). The leg is then extended, abducted, and internally rotated. If reduction has been effected the length will be equal to that of the other leg and internal rotation will be easy and the leg will remain internally rotated. A plaster-of-Paris spica is applied with the knee in slight flexion. The pelvis must be firmly gripped and the foot must be included. The degree of success probably depends upon the fixation which any individual operator can obtain with his plaster. Recumbency is enforced for two and a half months; the patient should then be encouraged to walk in the plaster, the foot having been released. If this is found impossible a walking calliper can be applied at the end of three and a half months. Since the leg is abducted, the other foot should be raised slightly when walking is started.

The following details give an idea of the duration of recumbency and the results of subcapital fractures.

CASE 1.—Aged 23 years. *Walking three months after* the fracture. Final result: no pain; bony union; no deformity; can walk any distance; rides a bicycle.

CASE 2.—Aged 67 years. Walking at the end of two and a half months. Bony union; no deformity; no pain. Movement three-quarters of normal. Suffers from extensive osteo-arthritis in both knees and in the other hip. Has attended Harrogate for years for rheumatism. Now can walk any distance in reason. Dances and plays golf.

CASE 3.—Aged 53 years. *Walking in two and a half* months. Bony union when examined one year after accident.

CASE 4 (Fig. III.).—Aged 58 years. Walking in three and a half months. Result: bony union; no shortening; wears high-heeled shoes; has slight pain. Can walk a mile and can stand on injured leg.

CASE 5 (Fig. IV.).—Aged 43 years. Walking in five months. A little pain. Has old-standing thrombosis. Can walk a mile easily. Can stand on injured leg; can go upstairs well; has no limp. Bony union when seen one year after accident.

CASE 6.—Aged 59 years. Walking in five months; timid; bony union; no deformity; no pain; no limp. Can walk easily for two or three miles. Did hill-climbing fifteen months after the accident. Can stand on injured leg.

CASE 7.—Aged 73 years. Walking six months after accident. Half normal movements of hip; half an inch of shortening; no pain; can get about freely. Bony union one year after accident.

In all the 13 recent fractures treated actively bony union took place in good position and with good function. There were no complications such as pneumonia or pressure sores.

RADIOGRAPHIC EVIDENCE OF LIVE BIRTH

BY MIRON HAJKIS, M.B. Oslo, L.M. Rotunda

(WITH ILLUSTRATIONS ON PLATE)

Sydney Smith[1] states that if a child has not breathed the stomach and intestines contain no air. My own findings agree with this statement. Using X rays I have been unable to demonstrate air in the stomach or intestine of stillborn children, even when a large quantity of meconium has been passed (Fig. I.). My observations also support Smith's view that the presence of air in the stomach and bowel is a useful confirmatory sign of respiration, especially in "cases where the lung has not been expanded either from weakness of the respiratory movement or from blocking of the respiratory passages. In such cases," he says, "air may still be swallowed, and from its presence in the stomach and bowel afford evidence of attempted respiration."

Breslau (quoted by Buchanan[2]) states that the presence of gas in the stomach and intestine is contemporaneous with respiration and independent of the ingestion of food. I have found X ray evidence of air in stomach and bowel in all of six infants with extensive atelectasis which were born alive and survived for periods from five minutes to eight hours. Indeed, in the new-born live child, which has not been fed by mouth, the stomach and intestines are often outlined radiographically as if they were filled with an opaque meal (Figs. II., III., and V.). In all the cases I made a post-mortem investigation immediately after radiography, and the findings corresponded with the X ray pictures in regard to the extent of atelectasis and presence of air in stomach and intestines as tested by the routine forensic methods. The radiographic examinations showed that atelectasis was most pronounced in the bases of the lungs, more in the left than the right lung, and that aeration was established in the margins (Taylor) or the right apex (Glaister). It may be suggested that in the cases illustrated the air in the bowel came from insufflation, but this can be disproved by referring to other cases in which this procedure was not resorted to (Figs. III. and V.). Further, I made experiments on stillborn infants immediately after birth to discover whether air can be made to enter the bowel by mouth-to-mouth insufflation, and I found that even by gross exaggeration of the clinical method I could inflate only the stomach. I agree, therefore, with Buchanan that air in the duodenum is strong evidence of live birth. Even when radiography was delayed until 24 or 48 hours after insufflation it was noted that air had not entered the duodenum (Fig. IV.) though the stomach showed slightly more distension. (The bodies had been kept in a mortuary at about 65° F.) Nor was I able artificially to inflate the lungs in these stillborn infants.

The penetration of air to the stomach and intestines is due to the vital functions of swallowing and peristalsis, and its presence in the intestinal tract is very striking in the X ray pictures in contrast to the imperfect aeration of the lungs in cases of extensive atelectasis. Of the three essentials in the establishment of life—namely, the action of the heart, respiration, and deglutition and peristalsis—full respiration is the most difficult to establish fully. Respiration appears to be impossible without deglutition and peristalsis, and in the infant, as in the adult, asphyxia exaggerates peristalsis and so encourages the movement of any air that enters the intestinal tract.

In the course of my investigations I came across one embarrassing case (Fig. V.).

A radiogram of this child, said to be born dead, shows poor aeration of the lungs, the highest point of the diaphragm being in the seventh interspace. There is air in the stomach and intestine. The presentation was by the breech, and during delivery of the head by the Mauriceau-Smellie-Veit manœuvre the accoucheur felt the attempts at suckling with his finger; there was no crying. The explanation of this contrary finding is that the child was alive when the face was on the perineum, but did not survive the completion of the delivery. The body being born the respiratory movements could be performed. Needless to say such a case might present a problem in medico-legal practice. At autopsy no other cause of death could be discerned—certainly not intracranial hæmorrhage. The hydrostatic test demonstrated flotation of all parts of the lungs.

In this connexion I would like to mention a paper by Dennen,[3] and only offer my support for his opinion that radiography should be a routine in the diagnosis of morbid conditions of the newly born and especially of cyanosis. In Dennen's case X rays showed in a six-hour-old child almost complete atelectasis of the left lung, and only partial expansion of the right lung. Four days later there was normal expansion of both lungs and the child survived, whereas in my cases the atelectasis was much more extensive and resulted in death. In such cases X rays would be of value not only in diagnosis and appropriate treatment as Dennen insists, but also in prognosis by indicating the extent of the atelectasis.

As in my cases I could discern no cause of death apart from extensive atelectasis—and especially not intracranial hæmorrhage—I was forced to the conclusion that the persistent atelectasis, to use Taylor's expression,[4] was the cause of death. Glaister [5] states amongst the causes of death in the newly born atelectasis is probably the most common of the lung conditions.

From the medico-legal standpoint X rays provide invaluable means of obtaining information about the presence of air in stomach and intestines. My observations show that air is to be found there only when the child has breathed, and in my opinion radiography of the lungs and intestinal tract provides the best proof of live birth. The possibility that gas may be produced by putrefaction in lungs or intestine must be borne in mind; but the bubbles arising in this way would give an appearance different from that of air-filled alveoli or bowel which has been aerated by peristalsis.

Part of this work was done at the Rotunda Hospital, Dublin, by kind permission of Dr. Bethel Solomons, then the Master.

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Sund, Bergen, Norway.

RENAL DWARFISM

ASSOCIATED WITH CALCIFICATION OF ARTERIES AND SKIN

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(WITH ILLUSTRATION ON PLATE)

Metastatic calcification occurring in chronic nephritis in adults, although extremely rare, has been known since Virchow first described five cases in 1855. But in chronic nephritis of childhood (renal dwarfism) an extensive search has revealed only two cases showing calcification of the arteries—viz., that of Smyth and Goldman[1]—in which five remarkably enlarged parathyroids were discovered at autopsy, and the case recorded by Karelitz and Kolomoyzeff,[2] in which large doses of viosterol had been given before the calcification was noted. The following case in which no vitamin D had been given and no enlarged parathyroids were found therefore seems worthy of record.

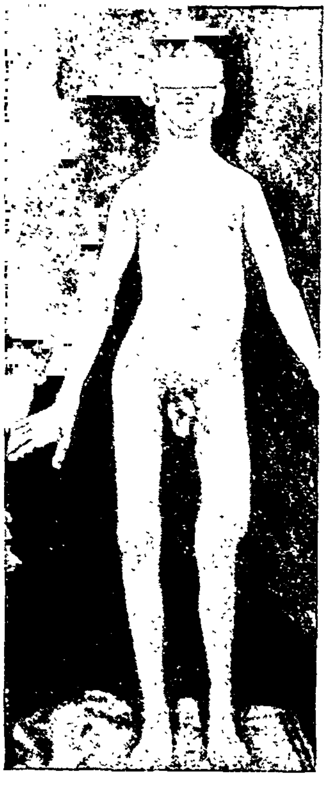
FIG. I.—Photograph of the patient.

A. B., aged 18, was sent to the skin department of the Sheffield Royal Infirmary on May 15th, 1933, on account of dry thickened skin with pigmented areas in axillæ and groins. As it was obvious that he was profoundly anæmic and extremely ill, he was transferred to the medical department. We there obtained a history that he had not been well and strong for many years, that he was always very thirsty, and passed a great deal of urine both by day and night. The thirst and polyuria had existed since he was a small child, and definitely before he had scarlet fever at the age of 6. There was no history of nephritis accompanying the latter illness. He appeared somewhat drowsy and mentally slow, but had reached Standard VII. when he left school at the age of 14. When 15 years old he began to work and developed knock-knee, for which an osteotomy was performed on the left leg. His appetite had been poor for many months, but he complained of no headache or vomiting. His height was 5 ft., his weight 4 st. 5 lb., and the accompanying photograph (Fig. I.) shows his undersized, rickety, and emaciated condition. His skin was dry, sallow, and pigmented, and in the areas noted was raised up into hard plaques. His lips were extremely pale and he had all the appearances of chronic nephritis in childhood. The heart was obviously enlarged, and the blood pressure was 155/100. There was no retinitis. The urine was very pale, specific gravity 1010 to 1012, albumin

1 to 2 g. per litre. Blood tests on admission to hospital on May 19th gave the following results :—

Hæmoglobin	30 per cent.
Red cells	1,560,000 per c.mm.
Colour-index	0·98
White cells	17,900 per c.mm.
Differential count	Normal.
Sedimentation-rate ..	Much increased
Wassermann reaction ..	Negative.
Non-protein-nitrogen ..	333 mg. per 100 c.cm.
Urea nitrogen	205 „ „ „
Cholesterol	179 „ „ „
Blood phosphorus	15·1 „ „ „
Serum calcium	6·7 „ „ „
Indican	Very strongly positive.

Radiogram of the spine, including the sacrum, showed remarkable erosion of bone. The limbs showed rickety changes with erosion, marked calcification of arteries (*Fig. II. on Plate*) and calcification of pigmented areas of the skin.

In hospital he became rather more drowsy and developed extreme dyspnœa. The non-protein-nitrogen rose to 400 mg. per 100 c.cm., and he died in coma without convulsions on May 28th.

At the post-mortem the kidneys (Fig. III.) were found to be extremely small, each weighing ¾ oz., and were of a pale mottled colour. Microscopically, the most striking changes were a great degree of interstitial fibrosis, and dilatation of the tubules. Aggregations of lymphocytes were present. The glomeruli were few in number and showed varying degrees of endothelial proliferation and fibrosis. The vessels showed hypertrophy, chiefly of the media. There was no hypertrophy of the bladder or ureters. The heart weighed 9½ oz., and there was some hypertrophy of the left ventricle. The lungs were very œdematous, with a small left-sided pleural effusion. Calcification of the medium-sized and small arteries was found as shown in the radiogram, but the aorta was quite free. The spleen contained three old infarcts, and calcified vessels could be felt in the pulp. The other organs were normal. There was no enlargement of the parathyroids. Sections of the skin showed calcium deposits immediately beneath the epidermis.

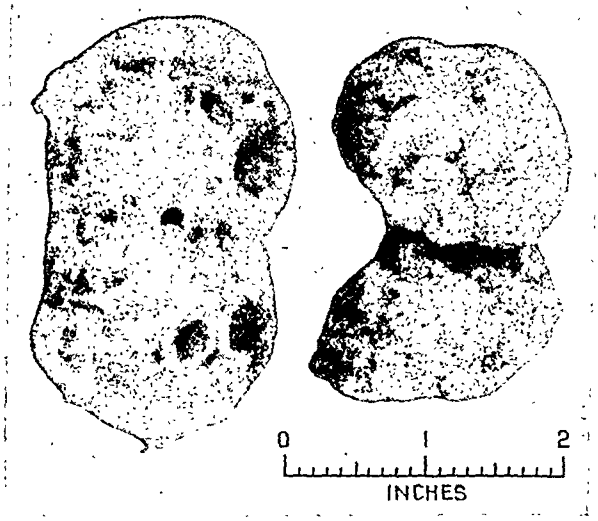

FIG III—Photograph showing extremely contracted kidney.

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BILATERAL SPONTANEOUS PNEUMOTHORAX

WITH REPORT OF A CASE

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(WITH ILLUSTRATIONS ON PLATE)

A CASE of bilateral spontaneous pneumothorax is seen sufficiently rarely to merit description, and when it does arise it stimulates an interest in a subject which, because of its rarity, receives but scant consideration in the ordinary routine of a tuberculosis service. Spontaneous pneumothorax (unilateral) is fairly frequent but the bilateral form has not been described more than 50 times.

Bilateral cases may be divided into two types: (1) successive and (2) simultaneous. The first variety shows the pneumothorax now on one side and now on the other, but never together on both sides. Naturally the second variety, in which bilateral pneumothorax occurs simultaneously, is more likely to end fatally.

The ætiology of bilateral spontaneous pneumothorax is not definitely agreed upon. Among the causes may be mentioned: (*a*) rupture of tubercles on the surface of the lungs; (*b*) rupture of emphysematous bullæ; (*c*) an inherent fragility of the surface of the lungs; (*d*) fistulisation through the mediastinum between both pleural cavities; (*e*) a possible anatomical deformity in the development of the lungs, in which the human development has simulated that of some of the lower animals, where the pleural cavities are connected; and (*f*) some violent exertion—e.g., coughing, sneezing, physical strain, and, rarely, trauma.

According to McMahon,[1] who reviews what has been written on the subject, 58 per cent. of cases of bilateral spontaneous pneumothorax are associated with pulmonary tuberculosis. These are usually fatal. Another 16 per cent. are associated with emphysema. These also usually end fatally. A few cases are associated with secondary growths of carcinoma, and naturally are usually fatal. A few cases are associated with trauma, and here there is some tendency towards recovery.

McMahon's case was not due to pulmonary tuberculosis, either clinically or radiologically. Meyer[2-4] describes two cases associated with pulmonary tuberculosis, and one unusual case which followed coitus and ended fatally after the fourth occurrence. Fine[5] reports one in which the condition was possibly due to long-continued colds and asthmatic attacks, was definitely non-tuberculous, but ended fatally. Lamont[6] described a case which was non-tuberculous but occurred after very extreme exertion and resulted in recovery. Bedford and Joules[7] report one in which the spontaneous bilateral pneumothorax developed apparently without exertion, and came on during the night; there was no evidence of pulmonary tuberculosis, and the patient recovered. Bourne[8] records a case in an infant which died of miliary tuberculosis, Emerson[9] one due to asthma, and Mills[10] one arising after injury. Miller[11] describes bilateral spontaneous pneumothorax due to chronic tuberculosis with recovery.

CASE RECORD

The patient was referred to me by Dr. S. H. Waddy of Huddersfield, to whom I am indebted for a résumé of her previous history.

In May, 1923, she suffered from influenza, which was followed by anæmia and scanty menstruation. This condition steadily improved. In April, 1924, there was a period of tachycardia, cardiac irregularity, and dyspnœa, which was the result of a very severe cold. During the whole of 1924 the patient had periods of general malaise and cardiac irregularity. In October, 1927, she complained of palpitation, dyspepsia, a sinking feeling after food, and a dragging pain in the left lower abdomen. There was at this time dysmenorrhœa, but no physical signs in uterus or abdomen generally. During 1928 and 1929 there were occasional attacks of sickness and gastric discomfort, and sometimes a sensation of a "hollow feeling." In October, 1930, she complained of pain in the right shoulder, which improved very quickly. This was diagnosed as a rheumatic pain. In November, 1930, the heart action was still irregular, and the patient brought up a little blood on coughing. The sensations she had were of a dragging nature from the throat down to the abdomen, and were apparently nervous. In February, 1931, the patient brought up slightly pink phlegm, a specimen of which was found to be negative for tubercle bacilli. In January, 1932, there was pain in the left arm and shoulder, the cause being either rheumatism or possibly referred pain due to her cardiac irregularity. During this month she had attacks of pain in the chest, rather general, and sometimes located on the right side, the latter suggesting a tubercular pleurisy. In February, 1932, she had slight hæmoptysis and tachycardia.

The physical examination of the patient, whom I saw shortly after the last hæmoptysis, revealed remarkably few physical signs of disease in the chest. I suspected the right lung, which had fairly widespread granular breath sounds, but no definite crepitations. There was slight dullness to percussion over the right lung, but in the left lung the signs were practically normal. The heart sounds were also normal. The patient's general condition was very good, and she was well nourished; the sputum test was negative, and in consideration of the history of cardiac irregularity one might have been tempted to rule out pulmonary tuberculosis entirely. Radiological examination was definitely necessary and the first report I was able to make, on April 22nd, was as follows (Fig. I.):—*Right:* deep-seated disease, which gradually becomes thinner towards the lung surface; a spontaneous pneumothorax is present, shown along the whole of the outer surface of the lung, regular in outline; no fluid present in pleural space. *Left:* certain amount of haziness of lung tissue, with some peribronchial thickening; fine nodular disease present. Heart: slightly to the left.

In the light of the above report the re-perusal of the patient's history made me suspect that spontaneous pneumothorax had probably been taking place in this patient's chest off and on since October, 1930, when she complained of pain in the right shoulder. I did not suspect the possibility of the case being a bilateral one, and still considered that the pain she had felt in her left arm in January, 1932, was a referred pain due to her heart action. Having formed the opinion that the spontaneous pneumothorax on the right side was probably due to a valvular opening in the visceral pleura of the right lung, I took the pressure in the pleural space a few days after radiological examination and found that it was −7 −4. I inferred from this, and from the physical signs, that the lung was expanding again. I therefore repeated the radioscopy on May 3rd and was amazed to find that a complete spontaneous pneumothorax now existed on the left side. The spontaneous pneumothorax on the right side had disappeared (Fig. II.). At this point I may add that the patient complained of slight pain in her left shoulder, a certain degree of dyspnœa, and some palpitation, but this did not prevent her travelling several miles to attend the radiological centre

I now concluded that I had a case of spontaneous bilateral pneumothorax of the successive type, but I was not certain when she might become of the simultaneous type. I therefore recommended absolute rest in a sanatorium for at least four months, in the hope that some pleural adhesion might develop to anchor these mobile lungs. On June 15th the left lung had almost fully re-expanded though there was a small pneumothorax at the apex; but on August 30th the left pneumothorax had again increased (Fig. III.). At the end of four months in the sanatorium she was considered by the medical officer in charge to be well enough to be sent home, and certainly her condition generally was very satisfactory. The day after her return home, however, she developed acute dyspnœa and very great collapse, and shortly afterwards died, evidently having succumbed to simultaneous bilateral pneumothorax.

COMMENT

In this case of bilateral spontaneous pneumothorax due to pulmonary tuberculosis a fairly long period of absolute rest was evidently insufficient to stabilise the lungs in a natural way. One may, therefore, infer that the natural tendency for the production of pleural adhesions was either absent or very slight.

The almost inevitable development of simultaneous bilateral pneumothorax, especially in a case associated with pulmonary tuberculosis, suggests that an endeavour should be made to produce pleural adhesions artificially. The ideal aimed at in the performance of artificial pneumothorax—i.e., the non-development of pleural adhesions—is reversed when the case is one of spontaneous pneumothorax. Any interference directed to the production of pleural adhesions is not indicated, however, unless the patient's general condition, as in the present case, is satisfactory, and the radiological diagnosis warrants it. The adhesions might be produced by some form of cauterisation, or, possibly, by the injection of some irritant fluid into the pleural cavity.

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LYMPHOGRANULOMA INGUINALE

ACQUIRED IN ENGLAND

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Reports of proved cases of lymphogranuloma inguinale acquired in this country are still rare. Cases purporting to be such have been recorded by McDonagh, by Hanschell, and by Gibson (1931); these were diagnosed on clinical grounds. Todd described a case which he claimed to be one of lymphogranuloma inguinale on the strength of the histological appearances of the excised glands.

The first case in which the diagnosis was confirmed by laboratory findings was described by Stannus and Findlay in February, 1933. Here Frei's test was negative, but as the patient was syphilitic this failure could be ascribed to "anergy." ("Anergy," described by Frei, is the condition where no response to antigen injection occurs, and may occur during the pre-menstrual period, in early syphilis, in tuberculosis, in septicæmia, and during prolonged pyrexia.) Later in 1933 Anwyl-Davies, King, and Findlay reported a case of lymphogranuloma inguinale, acquired in Limehouse, the pus from which produced characteristic changes on animal inoculation. Frei's test was not performed.

CASE-HISTORY

The present case is that of an unmarried man aged 24, a Cypriot, by occupation a scullion. Had lived in England for the past four years, without leaving the country.

MEDICAL SOCIETIES

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

At a meeting of this association held at B.M.A. House on June 26th, with Prof. Mary Lucas Keene in the chair, Dr. Letitia Fairfield spoke on

Eugenic Sterilisation of the Unfit

Dr. Fairfield based her observations on the recent report of the Departmental Committee on Sterilisation (the Brock Report[1]). She pointed out that the wide popular interest in sterilisation had grown out of two main factors. First, the increase in biological knowledge of the hereditary factor in mental and physical disease; and, secondly, the sociological outlook which attributed numerous evils of society to mental and physical "unfitness." The appointment of the committee was inevitable, for it had become fashionable to regard sterilisation as a panacea, and in the case of mental deficiency, for example, the over-emphasis on sterilisation had been allowed to swamp every other aspect of a many-sided problem. It was only fair to state that the efforts of many prominent eugenists and the findings of the Departmental Committee's Report were directed towards correcting these exaggerated claims. Dr. Fairfield then reviewed the findings of the report. She considered that the legal obstacles in the way of the eugenic sterilisation of persons of normal mentality had been somewhat exaggerated. As a matter of fact no one who was able to pay for such an operation at the present day had the least difficulty in getting it done and probably more hospitals were performing such operations than was supposed. No case of a surgeon suffering any penalty for doing a eugenic sterilisation was on record and it was impossible to imagine such a case being brought into court, provided that genuine grounds existed for believing that diseased offspring might be procreated. It was recognised, however, that the sterilisation of mental defectives is undoubtedly illegal.

In examining the present knowledge of the causation of mental defect the committee had evidently, Dr. Fairfield said, found itself on highly contentious ground. All their witnesses agreed on the important part played by "heredity" but they were not at one on the exact meaning of the term. Some would include in the family tree any deviation from the normal, including epilepsy, instability, delinquency, insanity, while others would confine the term to the transmission of a single defect such as certifiable mental deficiency. Naturally the percentage of "hereditary" cases differed according to the view taken, the variation extending from 5 per cent. to 80 per cent. The report had recorded some interesting researches into the mentality of the offspring of defectives, who showed an unexpectedly high rate of mental deficiency—i.e., nearly one-third of surviving children. She pointed out, however, that the figures were overweighted, as defective offspring were likely to call the attention of the authorities to defective parents. The report further blackened the picture by bracketing the "subnormal" and defective children, although the former might be little different from the general population. While assessing the part played by environment in causing mental abnormality many witnesses stressed the point that this factor acts in combination with defects of heredity, the thesis being: "Environmental factors may accentuate inherited weakness." The evidence also brought out a point which is still often overlooked—i.e., that mental deficiency is so devious in its manifestations that it cannot conceivably be a single unit transmissible in Mendelian lines, though certain subvarieties may be.

The final recommendations of the committee condemned compulsory sterilisation as unjustifiable in the present state of knowledge of genetics and likely to arouse public hostility. It was not clear, however, whether it would be possible to keep voluntary sterilisation really voluntary. It is difficult to imagine the precautions which would prevent enthusiastic committees from using the social services (such as outdoor relief), or the bait of discharge from an institution as an inducement to sterilisation. This was avowedly happening in other countries where sterilisation measures were on the statute book. As regards high-grade mental defectives, the committee evidently considered it an easy matter for a doctor to decide whether they were or were not mentally competent to give a valid consent to the operation, but no standards were laid down and Dr. Fairfield considered that in practice the point would be a very difficult one to determine. As regards mentally normal persons it seemed to have been overlooked that any attempt to regulate voluntary eugenic sterilisation would seriously restrict the freedom of action now enjoyed by the "well-to-do"—i.e., by all who could afford to pay for an operation. In future they would have to submit to an elaborate process beginning with two medical certificates, and involving reference to the Ministry of Health and possibly to the Board of Control or a special advisory committee of experts. Notoriously in the sight of a ministry a thousand years was but as a day, and the loving couple who longed to be united could hardly be expected to await inevitable official delays. It seemed probable that the regulation of voluntary sterilisation was doomed to failure. In view of the small proportion of institution cases who would be suitable for sterilisation, and the grave risks involved by any form of legislation on the subject, it seemed doubtful whether the recommendations of the report should receive general support.

Dr. C. P. Blacker (general secretary of the Eugenics Society) said he found himself in entire agreement with most of the points which Dr. Fairfield had made. The propaganda in favour of legalising eugenic sterilisation would, he said, do more harm than good if it were seized upon by local authorities as a justification for inertia or if it were interpreted by the general public as a measure likely to save the pocket of the ratepayers. Much confusion also centred around the meaning of the word "heredity." According to the report of the committee on mental deficiency appointed by the British Medical Association, the term "heredity" implied "that in the ancestry of any given case of mental deficiency there has existed a morbid condition of bodily and/or mental development, which may have taken the form either of mental deficiency or of some neuropathic condition, or of some other defect due to damage inflicted to one or other of the germ cells before fertilisation." According to this sweeping definition we would be justified in regarding as hereditary a given case of mental defectiveness if it were known that there had occurred in the ancestry of that defective a case of cleft palate in the time of William the Conqueror. Careful scrutiny of recent American and continental investigations into the heredity of mental deficiency pointed to the conclusion that the more carefully the pedigree was investigated the greater was the importance attributed to heredity as a causal factor and the larger was found to be the percentage of parents of high-grade defectives who were themselves on the borderline between subnormality and certifiable defectiveness. At the same time, it should be remembered that, though discussions on sterilisation continued to focus themselves upon mental deficiency, the recommendations of the Brock Report extended far beyond this sphere. The eugenic benefits, in fact, of legalising the voluntary sterilisation of mental defectives would probably turn out to be small as compared with the results of legalising it for persons who had recovered from mental disorder and for persons who exhibited or carried mental or physical disease or defect. The results, said Dr. Blacker, of the uncertainty in regard to the present state of the law regarding the sterilisation of persons who are compos mentis had at present the effect of discriminating against the poor. The legal risk, admittedly small, was willingly taken by surgeons who operated, in a private capacity, upon paying patients; the same surgeon, however, before operating upon a hospital patient usually found it necessary to obtain the consent of the superintendent of the hospital. This consent was often withheld, partly for fear of alienating Roman Catholic subscribers to the hospital and partly because, in view of the already long waiting-list, many hospitals hesitated to incur the smallest legal risk. Such discrimination between rich and poor was unfair, and it constituted a good argument for regularising the position for people of all classes by Act of Parliament. In the matter of safeguards, said Dr. Blacker, a course had to be steered between two opposing camps of critics, and, in his opinion, the recommendations of the Brock Committee constituted a happy via media. Some safeguards, he thought, were necessary. It was to be remembered that vasectomy was a simple operation, capable of being performed under a local anæsthetic; it took but a few minutes and necessitated at most a day's absence from work, yet it produced irreparable and irreversible effects. Every new law was exposed to certain criticisms and objections. Dr. Blacker was far from denying that a voluntary sterilisation law along the lines of the recommendations of the Brock Committee was exempt from these, but in deciding whether to oppose or to support it, the question we had to ask ourselves was: on balance did the advantages outweigh the disadvantages, and he believed that in this instance the answer was yes.

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[1] Vide THE LANCET, Jan. 27th, 1934, for a summary of the recommendations of this report; these were later discussed in a series of articles beginning on May 12th entitled "Eugenics in Practice."

REVIEWS AND NOTICES OF BOOKS

Elements of Experimental Embryology

By JULIAN S. HUXLEY, M.A., Hon. Lecturer in Experimental Zoology at King's College; and G. R. DE BEER, M.A., D.Sc., Fellow of Merton College and Jenkinson Lecturer in Embryology, Oxford. London: Cambridge University Press. 1934. Pp. 514. 25s.

THIS member of the Cambridge Comparative Physiology series is an excellent book, in which the authors have set themselves to give a connected account of "prefunctional" development in the light of experimental results. The field of research here is enormous, and we imagine that, among the facts presented and the provisional principles based upon them, there will be something new for everybody, and much that is unknown to many. The authors, faced with the mass of material, were compelled to put limits to their activities, and this book is essentially concerned with the biological problem of differentiation. Epigenesis, of course, describes the process, but something of preformation (but not in the old sense) is demanded by the fact at least of specific development. Gradients are brought in to account for the determination of the embryo from an undifferentiated egg. We confess that we have never been able to convince ourselves that the axial and other gradients of C. M. Child possess a value beyond that of descriptive terms, but there can be no objection to their use in a formal provisional theory to provide for the possibility of the change. The consideration of polarity, symmetry and asymmetry, cleavage, and *differentiation* is full and satisfactory. A long and detailed account of gradients and gradient fields is followed by a very interesting chapter on the differentiation of the amphibian nervous system, and this by one on hereditary factors and differentiation. Two more chapters and an appendix complete the text, and there is a good bibliography.

The authors disclaim categorically any desire to enter on philosophical discussions, and are evidently of opinion that physics and chemistry hold the secrets of biology between them. We may not view the organism in the same way, but that does not keep us from admiring this work. The task of presenting and classifying a heterogeneous mass of facts, and of establishing the various components of development, has been carried out in a masterly way. With the exception of Morgan's work on experimental embryology we do not know of any book in the English language in which the vast amount of fact and detail has been presented to the reader in such reasoned order and sequence. The volume ought to be within reach of every worker in biology.

Diabetes Mellitus

Diagnosis and Treatment. Fifth edition. By O. LEYTON, M.D., D.Sc., F.R.C.P., Physician to the London Hospital. London: Adlard and Son, Ltd. 1934. Pp. 144. 6s. 6*d*.

THE fifth edition of this book incorporates a good deal of new work. Nearly a quarter of the space is devoted to the diagnosis of diabetes mellitus. In most cases this is easy, but it may be very difficult. Dr. Leyton describes five methods of determining it: (1) sugar-tolerance test; (2) progressive diet test; (3) effect of pancreatic rest; (4) intravenous injections of glucose; (5) effect of toxins on pancreatic efficiency. The sugar-tolerance test is the one most used, and it is, as a rule, easy to interpret. It may give doubtful or even misleading results, and Dr. Leyton explains how these can be avoided. The progressive diet test is very valuable as it will often differentiate between doubtful sugar-tolerance curves. The observations can be completed in ten days at the most by Dr. Leyton's method; four days is considered sufficient by many workers. In some cases it is advisable to treat the patient with a diet which will rest the pancreas, and to repeat the sugar-tolerance test and progressive diet test at intervals of three to six months. The other two methods mentioned—

i.e., the effect of toxins on pancreatic efficiency and the intravenous injections of glucose—have not been much used. Dr. Leyton believes that "diabetes mellitus is congenital in the same way as tuberculosis is congenital." He says: "Some members of some families possess pancreatic cells which are exceptionally susceptible to some poison, probably, but not necessarily produced by bacteria or virus." He does not mention the possibility, which Houssay's work suggests, that the disease is due to an over-action of the anterior lobe of the pituitary, and that the Beta cells are not themselves diseased. The short section devoted to danger of infection and anæsthetics is clear and most useful.

The principles of treatment are well set out and are based on Allen's original observation that "a rested pancreas may regenerate." Dr. Leyton therefore aims at keeping the blood-sugar below 0·15 g. per cent.; he does not explain why he adopts this figure, which is less than that of most normal people after a meal—i.e., 0·18 g. per cent. in the capillary blood. He allows the patient as much carbohydrate as he chooses, but divides it up between the meals according to whether one, two, or three doses of insulin are given daily. The description of the symptoms of hypoglycæmia is very good, and the differential diagnosis between coma due to hyper- and hypoglycæmia is excellent. The book is essentially a small monograph, and contains many original observations. Some of the statements are provocative and the book is not always easy to read, but all workers on the subject will find valuable help as well as stimulation in its pages.

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1. La transfusion du sang de cadavre a l'homme

By SERGE JUDINE. Preface du Prof. A. GOSSET. Paris: Masson et Cie. Pp. 145. Fr.24.

2. Problèmes théoriques et pratiques de la transfusion sanguine

By ARNAULT TZANCK, Medécin des hôpitaux de Paris. Same publishers. Pp. 212. Fr.35.

1. Dr. Judine's book deals with a branch of blood transfusion which is wholly novel. Hitherto, in all countries blood has invariably been obtained from living donors. Dr. Judine, working in Moscow, was unable, for reasons that are obscure, to find any living donors and conceived the idea of obtaining blood from corpses. It seems improbable that, even in Moscow, the recently dead are more numerous than the still living, but, at any rate, the supply of corpses included a sufficient number of those dead by suicide, accident, or heart failure to render profitable an investigation of the possibilities. In the course of an extensive experimental and practical study many interesting points have emerged. Thus it was essential to discover whether the oxygen-carrying function of the blood of corpses was unimpaired and, if so, for how long. It was found that corpse blood produced the same degree of oxygenation in the recipient as living blood, and that a corpse could be used successfully for as long as eight to ten hours after death. For this length of time no clotting of blood took place, and the blood was not found to be toxic. The mode of death was found to influence the amount of blood obtained, for whereas 1½ to 2½ litres could be extracted from an intact corpse, less than half this amount could be got from one that had died by violent trauma. The really useful corpses, in fact, were those that had died from suicide or heart failure. The blood is obtained from the internal jugular vein with the body in the extreme Trendelenburg position. It is citrated and kept in the ice-chest until wanted and has been used after as long a period as 16 days; but it is not usually kept more than ten days. The use of corpse blood demands the same precautions and safeguards as that of living blood, and the indications are the same. The novelty of Dr. Judine's work lies in his study of corpse technique; and from our point of view it is only of academic interest, for it seems improbable that in this country it will ever be necessary to fall back, so to speak, on corpses.

2. Numerous monographs on the subject of blood transfusion have been published in recent years, and it is no longer easy to find anything to communicate that has the attraction of novelty. It is useful, however, to have summaries of the accumulated experience of specialists and Dr. Tzanck is master of his theme. The work is arranged in ten "leçons," which deal with the usual aspects of the subject, with the addition of some less usual ones, such as "difficult transfusions" with a few pages on "difficult veins," and the organisation of urgent transfusions. Here and there are found references to historical matters, but it is disappointing to find that the historical range is never permitted to extend outside France. And, indeed, this parochialism is characteristic of the whole book, so that it is difficult to discover whether the author has ever heard of any writers who have lived outside France other than William Harvey and Almroth Wright. The "bibliography" is in the same vein, including only the writings of the author and his associates. The book concludes with a series of 28 aphorisms on blood transfusion. Many of the opinions there expressed are in close agreement with those of earlier (non-Gallic) authorities, but Dr. Tzanck has presumably arrived at them all by the laborious process of personal research and observation.

Mechanism of Nervous Action

By E. D. ADRIAN, M.D., F.R.S., F.R.C.P. London: Humphrey Milford, Oxford University Press. Pp. 103. 10*s.* 6*d.*

THIS slender volume embodies the Johnson Foundation Lectures delivered by its distinguished author at the University of Pennsylvania in 1932. A brief yet informative sketch of the development of electrophysiology is given by way of introduction, after which Prof. Adrian plunges in medias res by discussing in his lucid manner the activity of single nerve-fibres and the nature of the nervous messages. He shows that changes in electric potential constitute a true index to what occurs when nerve-fibres are in action, and that impulses set up by electric stimulation of motor nerves are in point of fact identical with those arising from sense-organs or nerve-cells. Waves follow each other quickly or slowly, that is, are graded, and apparently no other kind of transmission can occur. Under natural circumstances, the effective mechanical stimulus that activates sense-organs is one of stretching the terminal part of the sensory nerve-fibre; the receptors discharge their impulses at so many a second—mostly at or above 20 a second, but also at lower rates. Here the application of his work to clinical neurology becomes evident; Prof. Adrian shows that variations in excitability and adaptation-rate exist, also in rate of conduction. He finds that different sensory fibres exercise different specific effects, though this is probably not so for pain. Non-myelinated fibres with slow conduction have endings which respond only to noxious stimuli, whereas rapidly conducting fibres are tactile only; but intermediate medullated fibres may give either a sense of contact or of pain according to the magnitude of the discharge. Prof. Adrian has not been convinced that varying sizes of sensory fibre correspond to muscle sense, touch, and temperature conveyance. His tentative conclusion is to the effect that both quality and intensity of sensation may depend, so far as concerns certain fibres, on changes in the discharge-rate.

Neurology

By Roy R. Grinker, Associate Professor of Neurology, the University of Chicago. London: Baillière, Tindall and Cox. 1934. Pp. 979. 38s.

Dr. R. R. Grinker has written a long and compendious treatise on neurology—using the term in its widest sense, for a considerable portion of the book is taken up with anatomical and physiological matter; contrasted with this, the space allotted to neuropathology is less adequate. So far as is made clear, the plan adopted by the author is to take some part of his subject—e.g., the cerebral cortex—and after discussion of its anatomico-physiological features to describe its disorders. This scheme, however, seems to have been modified so often that the reader is sometimes left rather bewildered; thus apraxia is briefly examined in connexion with the corpus callosum, nothing being said of its parietal significance. Aphasia is dealt with at the end of the chapter on the cerebral cortex; Dr. Grinker follows the conceptions and terminology of Sir Henry Head closely—and somewhat uncritically. Other parts of the same chapter discuss the symptomatology of disease of the several lobes of the brain, with the aid, in places, of large quotations from other writers—sometimes amounting to more than a page. Reference is made to anatomical niceties which are meaningless without a diagram—e.g., "Area 8 α β γ lies in the posterior part," &c., area 6a α is repeatedly mentioned but not defined except as "the greater part of the surface of the precentral area," and so on. Another peculiarity of arrangement is that to Motor Unit, Cerebellum, Muscle Tone and Posture, and Extrapyramidal Motor System, separate chapters are assigned, though the subjects are intimately interrelated; again, Spinal Tumours are placed between the sections on Spinal Nerves and the Vegetative Nervous System, Intracranial Tumours between the Cerebral Cortex and the Anatomy and Physiology of the Blood-supply to the Central Nervous System. The whole construction of the work thus leaves something to be desired.

On the clinical side the descriptions of different nervous affections are curiously unequal, and the internal arrangement of the material is often involved. For instance, the therapy of disseminated sclerosis is described before its differential diagnosis—incidentally, of the former we are told that "rest in bed and hope for spontaneous remissions are all that can be done" (sic). The account supplied of syphilitic amyotrophy (under the hybrid title of "amyotrophic meningomyelitis luetica") is too sketchy to be of value and conveys a misleading idea of its nature. A paragraph on the course of epilepsy is wedged in between descriptions of epilepsia partialis continua and of serial attacks.

The style of writing is unattractive. The reader is every now and again pulled up by a horrid blend of phraseology which is neither English nor any other language—e.g., "axis cylinder destruction with 'Abbau' attempts by microglia"; "the so-called 'anfalls paralyse' or epileptiform general paresis"; "there is a type of myelitis called *neuromyelite optique aigue*"; "Edinger's famous 'Ausbrauch's' theory may be mentioned," &c. If German or French terms are introduced they should be given in correct French or German, not a bastard variety. On p. 739 "Huebner's endarteritis" and "Heubner's endarteritis" are repeated turn about. Other errors of a grosser kind might be exemplified. But the book contains many good illustrations and diagrams, and at the ends of the chapters are useful lists of bibliographical references.

Abscess of the Brain

Its Pathology, Diagnosis and Treatment. By E. Miles Atkinson, M.B., B.S. Lond., F.R.C.S. Eng., Surgeon in charge of the Ear and Throat Department, Royal United Hospital, Bath; Consulting Aural Surgeon to the Trowbridge, Chippenham and Malmesbury Hospitals. London: Medical Publications Ltd. 1934. Pp. 289. 21s.

This work is an expansion of the Jacksonian prize essay submitted in 1926. It is based upon the study of a series of 23 of the author's own cases of brain abscess supplemented by eight additional cases illustrating kindred pathological affections of the brain and meninges. A fairly comprehensive outline is given of the pathological and clinical aspects of this condition. Inasmuch, however, as the author's own experience, as shown by the protocols of cases at the end of the book, is limited to the otogenic class of brain abscess, it has been necessary to draw extensively upon the published work of other investigators. The present state of our knowledge is adequately summarised. The discussion on treatment reveals something in the nature of a dilemma. The mortality-rates are notoriously high in all published series of brain abscess except that of Macewen, who achieved 18 recoveries in a series of 25 cases. This exceptional result appears to have excited an inferiority complex in his successors. Yet it is difficult to believe, in the face of so many acknowledged improvements in neurosurgical technique, that the modern surgeon is defeated purely on questions of technique. Mr. Atkinson ascribes a large measure of Macewen's success to the fact that his cases were selected: they were all of the chronic variety in which the abscess is walled off by a firm fibrous capsule. It might therefore be inferred that the correct policy in treating a brain abscess is to wait until the optimum moment for operation has arrived. This, however, would certainly result in the loss of many acute cases. Energetic surgical measures at an early stage seem therefore to be necessary, but when once drainage has been established Mr. Atkinson suggests that the surgeon should refrain from "meddling tactics." He is in favour of a double drainage-tube, one element of which should be large and have firm walls and the other smaller. It is then possible to dress the abscess cavity by gentle irrigation with hypertonic saline. Using such methods he has lowered the mortality-rate in his series to 55 per cent., a figure which compares very favourably with those from other sources.

By the avoidance of repetition and exhortation the work might have been considerably reduced in bulk without loss of clarity. Many of the illustrations would have gained by being enlarged so that they occupied the plates more fully; this is particularly true, perhaps, of the coloured drawings of histological preparations made by the late Mr. J. R. Ford. In all other respects the book is pleasantly produced.

Men and their Motives

By J. C. Flugel, Assistant Professor of Psychology, University College. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1934. Pp. 289. 10*s.* 6*d.*

This book is a collection of eight miscellaneous essays of which seven have previously appeared in various psychological journals. Two essays, entitled On the Significance of Names, and Some Psychological Aspects of a Foxhunting Rite, are written by Ingeborg Flugel. The two most important chapters deal with the relation of sexual and social sentiments and with the international language movement. The first opens with a comparison of the views of McDougall, who holds that the sexual and social instincts are separate, with those of Freud who regards them as ultimately identical. The author introduces the useful words homosocial and heterosocial to denote the social relations which exist between members of the same sex and of opposite sexes respectively. He notes that male homosociality is usually more developed than female, for which various causes are assigned; that the "sociality" of women is increasing, that the institution of the family may be antagonistic to that diffusion of interest which is demanded by social sentiments, and that "romantic" sexual love aids rather than impedes the formation of social sentiments. This relation points to an essential identity of sexual and social instincts, which validates the theoretical outlook of Freud rather than that of McDougall.

The essay on the international language movement seeks to interpret, in psycho-analytic terms, the unconscious emotional factors which affect the acceptance of the movement.

All the essays in the book take the form of psycho-analytic interpretations. The psychology of birth control, Maurice Bedel's Jerome (a very interesting critical study), and the character and married life of Henry VIII. are treated along these lines. Prof. Flugel writes throughout from the standpoint of an orthodox Freudian; but his essays have one inestimable advantage over those which too frequently emanate from his Freudian colleagues—they are clearly, carefully, and lucidly written. He never fails to make his meaning perfectly clear, and no sentence need be read more than once.

Studies in Blood Formation

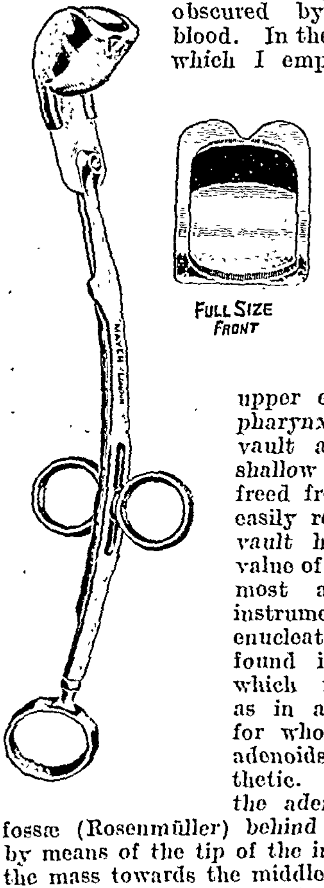
By T. D. Power, M.D., M.R.C.P., D.P.H., D.P.M., Deputy Medical Superintendent, Brentwood Mental Hospital. London: J. and A. Churchill. 1934. Pp. 124. 8*s.* 6*d.*

Dr. T. D. Power has collected into a small volume the results of his study of hæmopoiesis in rabbits under experimental conditions and in man during an attack of therapeutic malaria. As a result of his observations he concludes "it is very difficult to accept the view of Sabin and her colleagues that erythrocytes have an exclusively intravascular origin. . . . Erythropoiesis was always extravascular in character, and mature erythrocytes could be discerned lying outside the endothelial membrane which formed the capillary wall." He finds that sulfosin evokes a leucocytosis in rabbits as well as in man which he considers due to a hyperplasia of the granular element of the marrow. He suggests that the myelocytes under such stimulation arise directly from reticulo-endothelium without passing through the myeloblast stage. Thyroxine, he believes, exerts a profound stimulative effect on erythropoiesis. This action is possibly due to the fact that thyroxine hastens the process of cell differentiation. He describes an elaborate process of amitotic division in the cells of the reticulo-endothelium, but admits that "many of the findings . . . must appear to the reader as fantastic and without secure foundation . . . the phenomena cannot be detected easily, and . . . it is hopeless to search for it in the absence of first-class preparations and equipment." The book is clearly one for the specialist in hæmatology, whom it should stimulate to a closer study of the bone-marrow both in normal, experimental and pathological conditions.

NEW INVENTIONS

A NOTCHED LA FORCE ADENOTOME

Among the various references to the La Force instrument for the removal of adenoids, I have found none concerning a small alteration which may recommend itself to those using it without a good light or in a throat obscured by an accumulation of blood. In the medium-sized specimen which I employ I have had made a wedge-shaped notch which fits on to the posterior margin of the septum. When it is in position it is easy to make sure by the sense of touch that the tip is in the middle line. In by far the great majority of cases the point of the instrument reaches the upper extremity of the naso-pharynx, but if there is a vault above the choanæ the shallow notch can be easily freed from the septum and as easily returned to it after the vault has been cleared. The value of the "notch" is perhaps most appreciable when the instrument is used after the enucleation of tonsils. I have found it helpful in cases in which rapidity is necessary, as in a distinguished vocalist for whom I recently removed adenoids under a local anæsthetic. I recommend detaching the adenoids from the lateral fossæ (Rosenmüller) behind the Eustachian tubes by means of the tip of the index-finger and coaxing the mass towards the middle line before introducing the instrument. The notch must be only a shallow one, and it is only a shallow one that the structure of the instrument will stand. Its shape and position are clearly shown in the illustration.



Messrs. Mayer and Phelps, of New Cavendish-street, London, W.1, are the makers.

James Dundas-Grant, K.B.E., F.R.C.S., M.D.

⁂ We have received from Mr. Arthur Miller, F.R.C.S., an illustrated note describing a La Force adenotome notched with the same object in view. The advantages of the modification occurred independently to Mr. Miller and have been realised in his practice.—Ed. L.

THE LANCET

LONDON: SATURDAY, JULY 21, 1934

THE COURT EXPERT

MEDICAL men are included within the definition of "expert" in recently issued Rules of the Supreme Court whereby novel provision is made for the services of a "court expert" in non-jury cases. On the application of either side the court will have a discretion to appoint an independent expert to inquire and report upon any question of fact or opinion. If the expert's report is accepted by the parties, there will obviously be a great saving in time and in the laborious preparation of evidence by the witnesses who otherwise must be called by plaintiffs and defendants. It is probable indeed that, if accepted, the report will lead to the rapid settlement of many claims. On the other hand, if the expert's report is not accepted by all parties, it is to be treated as information furnished to the court and is to be given such weight as the court may think fit. This seems to mean that the judge is free to rely upon it to the exclusion of the evidence of the witnesses produced by the parties at the trial. Each side will be entitled to copies of the report and may then apply for leave to cross-examine the court expert thereon. This cross-examination may be ordered to take place either at the trial itself (the court expert being treated as an ordinary witness and being called at such stage of the trial as the judge may direct) or before an examiner. On giving reasonable notice before the trial, either party will be allowed to call one expert witness (or, in exceptional cases and with leave of the court, two or more such witnesses) to deal with the issue referred to, and reported upon by, the court expert. But the parties who thus call expert witnesses will run some risk as regards costs. Even if they win their case they will not be allowed the costs of their expert witness unless the judge specially certifies both that the calling of such witness was reasonable and that his evidence has materially assisted the court in determining the issue. The parties will, however, be allowed the costs of obtaining the advice of their own expert (whether called as a witness at the trial or not) as to whether the action should be brought or defended, or as to whether, or how far, the court expert's report should be accepted, or as to the matters on which the court expert might properly be cross-examined.

The kind of issue in which the court expert's services may be valuable will not necessarily be a medical question. The new rules contemplate the use of court experts on any scientific matter; recourse may be had not only to medical men but also to engineers, accountants, actuaries, architects, surveyors, and other specially skilled persons. Questions of personal injuries, however, nowadays occupy a large proportion of the total of judicial time; these, and questions involving allegations of negligence in professional treatment, appear to offer occasions for satisfactory recourse to the court expert. It is true that his services are to be limited to non-jury actions, but there seems to be a general drift at present in the direction of eliminating juries if for no better reason than the fact that non-jury actions make smaller demands on judicial time. Be that as it may, the new rules offer an interesting opportunity for the medical profession to play its part in the impartial administration of justice and to remove some of the popular prejudice which the partisanship of expert witnesses has provoked. The scheme is not entirely an innovation; ever since an Act of 1852 the Chancery courts have been able to call on the assistance of experts. Its present application will be experimental; it does not yet extend to the county court. No official provision is made for a panel; the rules merely say that the court expert shall if possible be a person agreed between the parties and, in default of agreement, shall be nominated by the court. He is to receive a fee for his report and for any supplementary work required and also a fee per diem for attendance before a judge or examiner. The court will fix the amount of the fees. If the expert thinks any test or experiment necessary, he is to inform the parties and arrange with them as to his expenses and their attendance.

While an advisory committee has recommended this new use of a court expert, the council of the Law Society has found itself unable to approve the idea. The solicitors think it will be hard for "a so-called independent expert" to arrive at a fair conclusion without himself hearing what other experts and witnesses of fact may have to say—in other words he will tend to usurp functions at present exercised by the court. The council also thinks there is a danger of the court expert finding himself to be, and being regarded by the court as, a person who is not merely about to give evidence but as a person whose evidence is about to be acted upon, so that here too the court expert, and not the court, would come to try the case. The Law Society, of course, is the representative body of an extremely conservative profession which has always been able to find objections—often good enough objections too—to any proposals for shortening and cheapening litigation. The Lord Chancellor's department paid the solicitors the compliment of consulting them about the new rules but was not deterred by their disapprobation.

CANCER VIRUS

IN his Oliver-Sharpey lectures Dr. C. H. ANDREWES gives by far the most complete survey which is available of the phenomena which associate an agent very similar to a virus with the origin of malignant tumours. Since PEYTON ROUS discovered that certain bird tumours could be propagated by cell-free extracts, there has been a growing conviction on the one hand that the Rous tumours are the centre of the cancer problem, and on the other, that the study of their agents is likely to throw critical light on the nature of viruses. Such a general review as was begun last week in our columns and is concluded on p. 117 is therefore timely. Dr. ANDREWES has little difficulty in showing that the filtrable agents which may be separated from many bird tumours, whether spontaneous or produced by such substances as tar, have a close resemblance in their nature and properties to many of the viruses which are the accepted causes of a number of infectious diseases. And the more such infectious viruses are studied, the less important do their differences from visible microbes become. In a very interesting table Dr. ANDREWES draws attention to the fact that virus-like agents may cause a variety of tissue reactions ranging from pure necrosis at one end of the series to pure proliferation at the other; in the intermediate zone are conditions such as fowl-pox, molluscum contagiosum, infectious warts, and rabbit myxomatosis. If foot-and-mouth disease and vaccinia at one end of the scale are by general consent due to viruses, it is certainly difficult in the face of the graduated series presented to say that a virus is, a priori, an improbable cause of tumours.

One of the most significant qualities of tumours is their extraordinary degree of histological specificity. It is recognisable in human tumours, but their life is so short that the fact emerges in a much more striking form from the study of transplantable tumours watched through many generations. Each mouse carcinoma has its own anatomical characters which it maintains as far as the evidence goes ad infinitum. The same is true of the spontaneous and artificial sarcomata of birds. The simplest explanation is to suppose that this heritable quality is dependent on some genetic change in the cells in which the tumour begins, but this idea is plainly not tenable in view of the fact that the same constancy of structure obtains when the tumours are propagated by cell-free filtrates. On the virus hypothesis, each fresh tumour arising from a filtrate is due to the stimulation of the virus and this implies a specificity of tissue response which is much less pronounced in animals as the result of the influence of accepted microbes. It may be that the actual tissue changes are in these familiar instances directly due to some products of tissue damage—produced alike by staphylococci and streptococci for example—rather than to the actual bacterial toxins. And bearing in mind that no virus has been shown to produce a toxin, and assuming that active viruses are always intracellular, it is perhaps easier to believe that tumour viruses cause these extremely specific anatomical results. Dr. ANDREWES might also, we think, have drawn on the analogy of plant galls in which the anatomical inflammatory reaction is so specific that the species of the infecting parasite can be predicted with certainty from the appearance of the lesion.

The great practical danger of preaching any form of a parasitic theory of cancer is that thoughtless people are too apt to draw the implication that cancer is a catching disease, and to have their attention distracted from the many hygienic measures by which cancer may be prevented. There is of course no evidence whatever that cancer is infectious in any ordinary sense, and however completely the virus-like nature of the agents by which fowl tumours may be transmitted is established, there is no justification for any assumption that this agent is capable of a free and independent life. These considerations bring us to what is, we believe, the pith of the whole problem—where does the virus come from? Does it originate in the tumour or does it come from some extraneous source? Attempts to solve this problem along immunological lines, of which Dr. ANDREWES's own work forms a conspicuous part, give no clear-cut answer, and this is not surprising. It is obvious from morbid histology that malignant tumours are recognised by the normal tissues about them as in some degree foreign, and it is clear that they excite in the body a response which is both local and general. But this is no longer of any great weight in deciding whether they are wholly autochthonous or not. Modern work on the antigenic specificity of denatured and artificially compounded proteins would in fact lead one to suppose that any normal tissue which was so altered as to be a tumour would probably be antigenic to the animal in which it grew. That the cell-free agent may be antigenic is fairly clear, though the specificity of the response is obscure and muddled in any case; this provides no proof that the agent does not arise in the tumour. Dr. ANDREWES believes that it does, and in the concluding parts of his second lecture he inclines to the view that tumour viruses are integral parts of normal cells which under certain circumstances are set free to produce the characteristic changes in the cells. If that is so, the effective discovery of the cause of cancer depends on the definition of the circumstances under which these "indigenous viruses" become active rather than on the study of the viruses themselves. A great deal is known about them already and Dr. ANDREWES's lectures link up very naturally with a whole field of clinical hygienic and statistical work with which he does not deal.

PARLIAMENT AND CHILD MORTALITY

SPEAKING in the House of Commons on June 20th, on a vote for the expenses of his department, the Minister of Health stated that the death-rate of children under 5 years of age from bronchitis, measles, and diarrhœa had been cut down by more than one-half in the last 15 years. During the adjourned debate, which took place on July 3rd, the only reference which appears to have been made to the subject was an expression of satisfaction by Sir FRANCIS FREMANTLE. The fact, if it is a fact, deserves to be given prominence, because the complaint is often heard that the toddler, the child between 1 and 5 years of age, has been neglected in the administrative schemes of local authorities for the welfare of children, and because the respiratory infections have been regarded as the least amenable to control. Diarrhœa has been recognised as a vanishing disease in epidemic form, and a large part of the credit must be given to the work of infant welfare clinics in educating mothers and putting them in the way of obtaining foods for their infants which are comparatively safe from contamination. The mortality from this cause per 1000 children under 5 years of age has been almost exactly halved since the early post-war years, and there has been no recent outbreak comparable with the exacerbation which occurred in 1921. The menace to child life of diarrhœa may fairly be said to have been overcome.

Examination of the returns of death from the other two causes mentioned by the Minister inspires less confidence. Measles is a disease which is almost regularly biennial in its incidence, although its effect on death returns tends to be smoothed in statistics of calendar years by its usual prevalence in the winter, overlapping the end of one year and the beginning of the next. More important, its incidence fluctuates in long cycles, and we ought to be sure that we are not comparing figures for years on the crest of a wave with those in a trough. It is not unlikely that we are at present going through a period of rather low prevalence, so that a comparison with the early post-war years when a wave was just dying may be quite misleading. As regards bronchitis, again, it would obviously be wrong to compare the mortality in 1918–19 with any other year or group of years. For one thing there were years of epidemic prevalence of influenza; for another, the fatality among the children was relatively lower then than in other major epidemics before or since. The picture is therefore confused. But it is true that the death-rate under 5 years of age from bronchitis has been consistently running in recent years at a level half as high as that reached in 1919–20. The significance of these figures is doubtful. A far larger number of deaths under 5 years of age is now classified under the heading pneumonia than bronchitis. For instance, in 1931 12,634 deaths at these ages were attributed to pneumonia (all forms) against 2928 from bronchitis. The discrepancy was not nearly so great in 1920 and 1921; in the former year pneumonia accounted for less than twice and in the latter little more than twice, the number of deaths classified as due to bronchitis. Now, the mortality from pneumonia among children has not declined to nearly such a striking extent during the last 15 years. The rate in 1930–32 was approximately two-thirds of that in 1920–21. Indeed, in 1929, when influenza was epidemic, and with a smaller population at risk, there were more deaths from pneumonia in children under 5 than in any year since 1918.

It is important that we should be clear on these points, because practical issues are involved. In a letter which appeared in *The Medical Officer* of July 7th Prof. R. M. F. **Picken** draws attention once again to the problem of overcrowding in dwelling-houses and its effect on child life. This observer points out that it has been customary for many years to allocate less cubic or areal space to children than to adults. For instance, model by-laws for houses let in lodgings or in an improvement area issued by the Ministry of Health since the passing of the Act of 1930 provide at least 40 sq. ft. per adult occupant of a room used for sleeping purposes, but only 30 sq. ft. for each child. If it be true, as Dr. **Percy Stocks** suggests in a recent analysis of death-rates in relation to density of occupation,[1] "that the effects of overcrowding are far and away most serious at the pre-school ages," and that the selective effect of crowding upon child mortality is largely manifested in respiratory causes of death, it seems irrational to maintain a low standard of spacing for families with young children. The influence of spacing upon the incidence of droplet infections has been repeatedly shown, the most outstanding examples being found in the work of J. A. **Glover**[2] on cerebrospinal meningitis and of **Sheldon Dudley**[3] on the common infections of childhood. Overcrowding in houses is, from the medical standpoint, one of the most important aspects of the housing situation. It is understood to be the objective of the next move in the Government's housing campaign. Standards of crowding will have to be embodied either in the Bill itself or in by-laws of local application but with some national uniformity. Outside medical circles it does not seem to be realised that young children, above all others, require the maximum amount of air-space which can possibly be provided for them. It would be a mistake to attach too much significance to statistics showing the fall of mortality from the air-borne infections of childhood over a period which is short and probably in some respects exceptional.

THE NATIVE'S DOCTOR

The provision of adequate medical and sanitary services in the sparsely populated areas of tropical and subtropical countries, constitutes one of the major problems of administration. A number of difficulties stand in the way of a satisfactory solution of the problem. In the first place, there is the economic status of the population which, generally speaking, is pastoral, with a low-earning power, and is widely scattered over country in which travelling is frequently very difficult. It is for the most part impossible to expect such a population to pay for their medical services. On the other hand, the financial position of many of the countries which they inhabit precludes the provision of a fully paid Government service. Some colonies, notably French Equatorial Africa and Uganda, are developing a system of medical and sanitary services for the natives by means of a native subordinate personnel, at the head of which are European doctors. The native personnel consists of medical orderlies, a few female nurses, and men educated almost, but not quite, to the grade of medical practitioners. In Uganda these are designated senior African medical assistants. Their training is carried out at the local medical school with which is connected a fully equipped training hospital. They are licensed to practise medicine under the local laws, and are placed in charge of the larger dispensaries and also hold certain hospital posts under the European medical officers. The Uganda system has only been in operation for a short time, and it is perhaps a little early to be certain of its usefulness. So far, however, the experience with it has been satisfactory.

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[1] See THE LANCET, 1934, i., 1139.

[2] Medical Research Council, *Special Report Series* No. 50.

[3] Ibid., No. 111.

The South African Government has recently decided to institute a somewhat similar system of training in connexion with Lovedale College, which is a Government subsidised institution for the higher education of natives. The establishment of a training school for what will be known as "medical aids" has now been sanctioned, and owing to a generous gift of £75,000 from the Transvaal Chamber of Mines it has become possible to begin training during the present year. The South African medical aids will be admitted to the medical school after passing at least what is known as the Junior Matriculation examination. They will then be given a preliminary education at the college, principally in language, physics, and chemistry. Those who in this first year prove their capacity for further education will then enter upon a four-year course in medical subjects, both theoretical and practical, at the expiration of which they will be given a joint certificate from the public health department and the Lovedale College, that they have satisfactorily completed the course, and this certificate will automatically entitle them to enter the Government medical service as medical aids. They will then be given a year of special training directed towards familiarising them with the particular work in which they would be engaged in the service—for instance, leprosy, malaria, general dispensary work, and so forth. They will not be licensed to practise medicine for gain, but only to practise under defined conditions as long as they remain in the Government service. The scale of emoluments, which includes a free house, has, it is thought, been made attractive enough to secure the best class of candidate; the salary will start with £240, rising to £300. In addition to the medical aids, it is also proposed to increase the facilities, at present inadequate, for training native girls as nurses and midwives, and also for the establishment of a lower grade of nurses, both male and female, to be known as "nurse aids."

It will be noticed that the medical assistance is stressed rather than preventive service. The ultimate aim of medical services for natives is, of course, prevention, but experience has proved beyond a peradventure that in order to inaugurate a successful preventive service in native areas, it is essential first of all to gain the confidence of the inhabitants by offering them adequate curative services. For many years to come curative and preventive services will have to march side by side and hand in hand. This point emerged clearly from the deliberations of a conference, held under the auspices of the League of Nations in South Africa in 1932, in which representatives of the medical services of most African colonies and also India took part, and it is also emphasised in the description of the subdispensary system in Uganda, by Dr. W. LESLIE WEBB, in the *Tropical Diseases Bulletin*, June, 1934. In South Africa, in Uganda, and in French Equatorial Africa, the ultimate aim is to establish rural dispensaries based on a centrally located hospital, the medical personnel of which will by periodical visits constantly supervise the work of these dispensaries. The importance of the preventive side of their work will be impressed on the medical aids, the nurses, and midwives, not only during their training but also thereafter; and it is hoped, with some justification, that gradually these dispensaries will become centres for the spread of knowledge of community and personal hygiene. They will no doubt from the very beginning be useful intelligence centres for the discovery of threatened epidemics. These experiments, in the technical if not professional education of the native, will certainly be worth watching during the next decade, and it will be of interest to note which of the various schemes in operation appear to give the best results.

A STATUTORY HOUSING COMMISSION

IN its final report[1] the National Housing Committee, whose interim report we noticed a few weeks ago,[2] has developed its plea for the establishment of a statutory housing commission with cogent argument. The proposed body would in no way supersede but would assist the local authorities to implement a policy of building on a ten years' programme over the whole country. Under this scheme the Minister of Health would retain general control over borrowings and over the amount and nature of any Government subsidies, and would also keep his quasi-judicial functions, such as the confirmation of compulsory purchase orders, clearance orders, and by-laws. But the Commission would take over certain powers: it would obtain estimates of housing needs from the various localities; would be vested with the power to approve location and coördination of sites, purchase price of land, cost of building, and type of houses to be erected; would be charged with powers to carry out duties in the matter of housing which had been neglected by a local authority; and would act as the adviser to the Ministry on technical matters. The general duties of the Commission would include making surveys of housing needs, the organisation of labour and materials, research, the formation of public utility societies, the encouragement of decentralisation, the supervision of plans for large scale reconditioning, the financing of local authorities and public utility societies at trustee rates of interest, and, most important, the control of the pace at which the programme is carried out. Precedents are quoted, for example, the Central Electricity Board, for the establishment of a body which should be independent of politics and also able to provide a continuity of policy. The case for and against the proposals is being discussed in the House of Lords as we go to press, and we anticipate that the argument that such a Commission would prove to be the best agency to secure the provision of a million new houses in ten years will not be found easy to refute.

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[1] A National Housing Policy. London: P. S. King and Son. 1934. Pp. 81. 2s.

[2] See THE LANCET, 1934, i., 1123.

ANNOTATIONS

A FESTSCHRIFT TO SIR ROBERT MUIR

THE last number of the *Journal of Pathology and Bacteriology,* issued on July 5th to celebrate the seventieth birthday of Sir Robert Muir, F.R.S., s wholly written by his pupils, and we notice that among the contributors are 11 professors of pathology or bacteriology. This fine volume of 253 pages, with 52 plain and coloured plates, is a noble tribute of respect and affection to one whose influence and leadership in British pathology is unique, not only as the author of deservedly popular text-books which are widely used, but as the inspirer of many able young men to lead fine lives. There are in the number 19 substantial contributions to knowledge, and between them they cover practically the whole range of topics with which pathology is concerned. Prof. M. J. Stewart, of Leeds, along with Dr. J. S. Faulds, describes the silicosis and siderosis of the lungs in Cumberland hæmatite miners; tuberculosis is generally present as well. Dr. J. W. McNee, in London, records and illustrates two remarkably large spleens which he thinks may as well be called sarcoma as anything else. Prof. J. Shaw Dunn, of the Royal Infirmary in Glasgow, contributes an interesting discussion of nephrosis and nephritis in which he correlates the morbid histology with the views of physiologists about renal function. Prof. J. H. Dible, of Liverpool, questions the correctness of the usual interpretation of fatty degeneration of heart muscle, and as the result of a number of combined chemical and histological examinations concludes that the extra fat is depôt fat brought in from elsewhere, and not the result of disintegration of the cardiac protoplasm. Dr. Ivy Mackenzie, of Glasgow, discourses on two well-studied cases of degeneration of the lateral geniculate bodies and discusses the light which they throw on the pathways of visual sensation. Prof. J. Cruickshank, of Aberdeen, has an elegant method of studying the growth and metabolism of photogenic bacteria from sea fish by photographing the colonies by their own luminosity. Dr. Sutherland Strachan analyses the incidence of malignant disease in Johannesburg and points out the relative abundance of primary carcinoma of liver in the natives, its association with cirrhosis, and its early age-incidence. Prof. J. W. McLeod and his associates at Leeds discuss the diagnostic isolation of the gonococcus, and Dr. R. Cruickshank, of Glasgow, confirms his previous suggestion that the characteristic acid reaction of the vagina is due to the fermentation of the epithelial glycogen by Döderlein's bacillus. Other papers by Dr. J. W. S. Blacklock, Prof. D. F. Cappell, Prof. C. H. Browning, Prof. T. J. Mackie, Prof. E. M. Dunlop, Dr. J. W. Howie, Dr. J. Kirkpatrick, Prof. G. H. Wilson, Prof. J. S. Young, Dr. J. A. W. McCluskie, and Dr. Janet Niven are no less interesting, and come from Dundee, Edinburgh, Newcastle, Birmingham, and Belfast, as well as Glasgow. The whole forms a record of which any school might justifiably be proud, and we doubt whether Sir Robert Muir had any other present on his birthday which pleased him as much. We wish him many happy returns.

THE POSITION OF THE AMERICAN HOSPITALS

IN the quarterly *Bulletin* of the American College of Surgeons, just issued, a statement will be found on the situation of the American hospitals under the National Recovery Programme. The statement is furnished by Sister John Gabriel, an educational director of the Sisters of Charity of Providence, and she has gone to authoritative sources for her information and reasoning. The working of the National Recovery Act was at first viewed with apprehension by hospital executives, who saw before them in its provisions the burden of additional obligations in any attempt to achieve the standards set forth for re-employment. Accordingly the committee of the American Hospitals Association, which included representatives of the Protestant and Catholic Hospital Associations respectively, decided to ask for exemption from the Act on the basis of inability to meet the necessary financial commitments. Representatives of the three associations stated their case effectively, legal support for exemption was obtained, and the three associations received an official letter that private hospitals did not come within the purpose and scope of the National Recovery Act. All hospital managements have recognised the patriotic decision of President Roosevelt to adjust the stupendous problem before him, but further financial burdens could not be borne by the majority of the voluntary hospitals of the United States, and the attempt to carry them would have led to many disasters. The arguments which prevailed for exemption were set out last September in the *Bulletin* of the American Hospitals Association by the well-known constitutional lawyer, Mr. Borden, and the point was then made that hospitals cannot be considered as industries; they are not producing organisations but charitable institutions, and the restrictions of their operations would add to the cost of illness for the public. The right of recognition by the Government that hospitals are relief agents and not commercial enterprises may not be formally admitted, and it is difficult in some cases to assert of certain enterprises that they are purely welfare institutions maintained for charitable purposes. There are difficulties ahead, but there is promise that they will be surmounted.

THE ÆTIOLOGY OF INFLUENZA

IT will be recalled that R. E. Shope has produced evidence that swine influenza is caused by the action of two infective agents, a virus and a bacterium (*Hæmophilus influenzæ suis*). A year ago Smith, Andrewes, and Laidlaw reported in our columns that the swine influenza virus would produce in ferrets a disease like that which they obtained when these animals were inoculated with a virus believed to be that of human influenza; this consisted of fever and symptoms referable to inflammation of the nasal mucosa. Shope[1] has now confirmed and extended this observation. He finds that if the instillation of swine influenza virus into the nose is made under ether anæsthesia, the ferrets develop not only nasal infection but an acute pneumonia of lobar distribution; in a number of animals this has proved fatal. The affected lungs were "deep bluish-red in colour." The histopathology was "essentially that of an edematous pneumonia"; the alveoli were distended, containing fibrinous exudate with a few cells, and the alveolar walls were much thickened. A point of great interest is that the lung lesions were apparently caused by the virus acting alone. There is thus a contrast with the disease produced by the same virus in pigs, where the presence of a bacterium in addition to the virus is necessary to produce the complete disease picture. The interest of these studies in relation to human influenzal pneumonia is obvious. More difficult of interpretation is a paper by A. Eichhorn and N. J. Pyle.[2] These workers obtained last year from Smith, Andrewes, and Laidlaw some of the virus which they had isolated from human influenza. With this they were readily able to infect ferrets at the Lederle laboratories near New York. Work on dog distemper is in progress at the same laboratories, and the ferrets recovered from the influenza were used for this distemper work. It was unexpectedly found that they were partly immune to the distemper infection; a few proved quite insusceptible and the remainder went down after a longer incubation period than usual. A second experiment confirmed this result. The authors believe that "the experimental data suggest a possible relationship between influenza in man and distemper in dogs." No evidence is offered as to the reaction of distemper-immune ferrets to the influenza virus; but the results of further studies on cross-immunity and of cross-neutralisation tests with antisera are promised. Until these are available we shall do well to suspend judgment on the possible importance of the observations. The behaviour of the distemper and influenza viruses in the ferret is, however, so entirely different, that on this ground alone a close relationship between the two viruses would be surprising.

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[1] Jour. Exp. Med., 1934, lx., 49.

CONGENITAL TORTICOLLIS

THERE seems to be some discrepancy in the opinions expressed by different observers on the relative frequency of the congenital as opposed to the acquired type of torticollis. It is possible that this may be due to disagreement as to the criteria on which the diagnosis of a congenital lesion shall rest; for according to Dr. Garry de N. Hough,[3] who analyses 39 cases from 1898 admissions to the Shriner's *Hospital for Crippled* Children, Massachusetts, during the years 1925 (February) to 1933 (September), a great proportion of children are not brought for treatment until infancy is well past. There seems to be a slight predilection for the right sternomastoid muscle rather than the left; the condition is as common in boys as in girls. It is noteworthy that the incidence has increased from 0·4 per cent. in 1925 to 3·5 per cent. in 1932 and 1933.

Of the different theories of ætiology advanced at different times, hæmatoma caused by birth injury, infective myositis, and ischæmic fibrosis have perhaps received most attention by recent writers. Of these theories Hough favours that of ischæmic fibrosis, and in support he cites the experiments of B. Brooks, who produced an analogous condition in the sartorius of the dog by venous ligation, and of P. N. Jepson, who found that venous blockage of a few hours' duration could give rise to persistent fibrosis. The vascular disturbance associated with torticollis in children is presumed to arise from forced positions of the head during delivery. Pathological examination of the tumour, present in the sternomastoid in a fair proportion of the cases, does not lend much support to the theory that it has originated in a hæmatoma. The histological appearances are more like those found in the brachialis in Volkmann's ischæmic paralysis. Facial asymmetry of some degree is an almost constant feature of torticollis of the congenital type; often it is very noticeable. That it is a direct result of the oblique position assumed by the head is shown by the fact of its occurrence in other conditions, such as scar contractions and tuberculous disease of the spine, in which unilateral flexion of the head is present. Correction of the deformity of the neck is followed by gradual growth of the face and ultimate disappearance of the asymmetry. In Hough's cases the recovery was complete in from two to four years. He draws attention to an apparent *increase* in asymmetry of the face in the months immediately succeeding operation; this is, of course, an illusion due to the emphasis of the deformity when the head is held upright. The late appearance of the children for treatment is rather remarkable. In Hough's series of 39 cases, only four were under 18 months of age. Hough believes that this is to be accounted for by a late development of the deformity, and not by failure on the part of the parents to notice it. If this is so, the explanation is that the injury to the muscle —if such occurs—results in deficiency in growth, and not in contraction of its fibres. Subcutaneous tenotomy is not recommended by Hough, but open division of the sternal, and, if necessary, of the clavicular, head of origin of the sternomastoid. Excision of the sternal head is not only unnecessary, but has the disadvantage of producing an unsightly prominence of the inner end of the clavicle. In the most severe cases plastic lengthening of the muscle can be done, and even division of the mastoid attachment. The results of the operation are said to be good, provided care is taken in the after-treatment. Fixation in the corrected position was applied by helmet or collar for approximately six weeks, and subsequently treatment was by active and passive stretching, corrective exercises, and massage. When the patient is fortunate enough to be brought for treatment in infancy, most surgeons agree that cure can be quite successfully effected by daily passive stretching of the muscle into the markedly overcorrected position over a period of three months.

PERSPECTIVES IN PHYSIOLOGY

LAST week we had occasion to comment on the philosophy of the professor of physiology of the University of Cambridge. His colleague at Edinburgh in his inaugural lecture, published in the June issue of the *Edinburgh Medical Journal*, has also, from a different approach, made a contribution to the problem of academic physiological teaching which merits consideration. Modern tendencies in research and modern difficulties in teaching are set out; in Prof. Daly's opinion the latter are not insuperable, and he concludes with one or two constructive suggestions. With regard to research he champions the method of studying the isolated organ, and rightly points out that, although it is placed in an abnormal environment, this is at least controllable and allows of accurate observation and repetition of experiment. Mistakes in the interpretation of results and their too precipitate application to the normal organ do not invalidate the method, which is responsible for the majority of our recent acquisitions of knowledge. With regard to teaching, he welcomes the prevailing dissatisfaction with the present system, "for progress is built on the realisation of imperfection." His proposals are two. The first deals with the teaching system in the pre-clinical subjects; he suggests a short systematic course in each subject to be followed by a correlative course:

> "If this came about, we could look forward to . . . a series of *n consecutive* lectures to be held on the anatomy, morphology, histology, physiology, biochemistry, and pharmacology, *say*, of the digestive organs, to be delivered by A, B, C, D, and E. Following each other in orderly sequence, and given by the experts in each branch, these lectures would bring together all the knowledge necessary

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[2] Jour. Amer. Med. Assoc., 1934, cii., 2082.
[3] Surg., Gyn., and Obst., March, 1934, p. 972.

for the student in this particular field and give him an outlook which is only possible under the present mode of rigid separation by a vast amount of labour."

Prof. Daly pleads for "a trial in a small way" for this progressive scheme—progressive because it typifies the modern decline of omniscience and growth of collaboration, and because it prepares the student's mind for the synthesis of organs and systems and "subjects" into persons, which too often, in the hospital, comes as a shock to him. The second proposal relates to the student, embodying the suggestion that he comes to the university to learn rather than to be taught. Every teacher knows the difference between the man who regards his course as an opportunity to acquire as much knowledge as he can in the time, and the one who sits through it like a young bird in a nest with its eyes shut and its mouth wide open waiting for the morsels to be dropped into it. It is perhaps regrettable that the curriculum tends to be moulded to the needs of the latter, who ought not to be encouraged. However this may be, there is no doubt whatever of the excellence of the suggestion here made that:

> "Four, five, or even six . . . students get together in each other's rooms for the discussion of some pre-arranged physiological problem, say twice a week for one hour . . . they will gain a greater insight into the problems which beset them than they will as the result of many hours' reading on their own—they will certainly come to know physiology."

The same system might be applied to any branch of study. It is impossible to teach everything; beyond a certain point attempted improvement by selection and elimination defeats its object. The students at Edinburgh are fortunate in having a teacher with such a balanced outlook as this lecture displays, and others interested in the subjects of which he treats would do well to read it as an epitome of common sense.

JAUNDICE IN SYPHILIS

JAUNDICE occurs every now and again in the experience of all those who treat large numbers of syphilitics by modern methods, and it can be a very severe complication. Exactly what causes the symptom has always been a puzzle, and an exhaustive survey of the incidence of jaundice among over 10,000 cases of syphilis by U. J. Wile and W. M. Sams[1] does not clear up the ætiology. The cases were observed during a period of eight years, and it is of interest to note that they include 1040 cases of congenital syphilis. The cases of jaundice are divided up for investigation into pre-therapeutic and post-arsphenamine groups. In the first group diagnosable syphilis of the liver occurred in 91 cases (0·9 per cent.). The authors were at great pains to corroborate their diagnosis by every possible means, and believe that they have under- rather than over-estimated the actual amount of liver disease. The conditions recognised include early hepatitis (*a*) icterus gravis, (*b*) benign icterus, and chronic hepatitis (*a*) cirrhosis, (*b*) Banti's syndrome. Of the 91 affected livers only 13 gave rise to clinical jaundice; 2 patients had raised blood bilirubin, 1 gave a history of recent jaundice, and 2 had so-called catarrhal jaundice, giving a total of 18 cases of jaundice, or 0·18 per cent. of the total cases. Other authorities quoted show 0·37 per cent. (Werner) and 0·28 per cent. (Goldstein).

The number of cases treated by arsenic was 4126 in all, and of these 56 developed jaundice—i.e., 1·35 per cent. Figures from other authorities show a wide variation from 0·6 per cent. to 5 per cent. L. W. Harrison found that jaundice occurred less frequently than dermatoses but his cases were very severe and persistent. Taking the figures of Wile and Sams for both groups it will be seen that post-arsphenamine jaundice occurs 7·5 times as frequently as pre-therapeutic jaundice. On analysis it was shown that arsphenamine was to blame in twice the number of cases, calculated as a percentage, as neo-arsphenamine; that the intensive method of treatment (three injections in three days) did not produce more jaundice than the ordinary weekly method, and that no case of post-arsphenamine jaundice occurred in congenital syphilitics under 10 years of age. Further investigation showed that the cases could be divided into two groups, depending on the interval between injection and jaundice. In the early group the reaction occurred soon after an injection, either the first, when it was probably a Herxheimer reaction and the jaundice was transient, or after any dose when it may have been due to an overdose or to an idiosyncrasy. The cases of late post-arsphenamine jaundice include two-thirds of the total cases, and the authors found this to be the most puzzling group. This type of jaundice always occurred during the rest period between two courses of injections, an average interval being 80 days after the last injection. The theories as to the cause of this delayed jaundice are: (1) It may be a delayed toxic action on the liver; this is not proven by experiments, which fail to show an excess of arsenic in the excretions of these cases. (2) It may be due to a hepato-recurrence, which means that during the interval between the injections the liver has suddenly relapsed, due to insufficient treatment. It is known that mucus relapses occasionally occur, but the fact that most of the cases in this series were on some heavy metal during the relevant interval rules this out, as well as the fact that there were no cases of serological relapse. There is still another possibility (3) that these cases are merely manifestations of catarrhal jaundice occurring in a syphilitic patient. Blood counts and blood bilirubin estimations show no appreciable differences between syphilitic and non-syphilitic catarrhal jaundice, and it is difficult to exclude the possibility of coincidence. But the remarkably constant period after injection at which jaundice appears lends colour to the view that patients treated with a powerfully hepatoxic drug are more prone to exhibit the syndrome than persons with an apparently normal liver.

INTERNATIONAL CONVENTION FOR SUPPRESSING NARCOTIC DRUGS

AT the meeting of the Council of the League of Nations on May 26th, 1933, it was resolved to communicate to the various Governments a draft international convention for the suppression of illicit traffic in dangerous drugs together with a report of the Opium Advisory Committee thereon. Replies have been received from 32 Governments, 23 of whom are in favour of concluding a new convention; others have suggested modifications of the draft, while the United States and South Africa are not prepared to participate in the proposed convention. The Council, on the representation of the rapporteur, the Polish delegate, instructed the advisory committee to study the replies received and to prepare an annotated draft convention for submission to the Governments in accordance with the new procedure laid down by the Assembly in 1931. The Permanent Central Opium Board at its last meeting had its attention drawn to the accumulation of stocks of narcotic drugs which appeared to be disclosed by the statistics that had been furnished. It noted information supplied by the Hungarian Government regarding a new process for the manufacture of morphine in Hungary. It also investigated the considerable imports into Honduras of narcotic drugs of European manufacture in excess of legitimate needs, such imports having apparently been effected by false import permits. It is hoped that the new convention, when approved and ratified, will obviate a recurrence of such traffic and also secure the unmasking and adequate punishment of the master minds behind the contraband trade; these are often discovered in other countries than those actually concerned in the illicit commerce.

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[1] Amer. Jour. Med. Sci., 1934, clxxxvii, 297.

MEDICAL INSURANCE AGENCY

THE meeting of the committee of management of the Agency, followed by the general meeting, was held on July 12th, when the report and audited accounts were duly received and passed. The report showed progress in business transacted. The recommended assurance proposals dealt with during the year totalled 321, as against 302 in the previous year; during the year 900 contracts were effected, consisting of 1336 units providing for annual pension cover of £133,000. In regard to motor-car insurance the report showed that the Agency still makes an appeal to members of the profession in face of increasing competition, and while it is allowed that it has not been always possible to satisfy members in the matter of claims and settlements, in the main amicable settlements have been arranged.

After allowing for the commitments of the committee under various covenants already incurred, the sum available for distribution, in addition to the surplus unallotted from the previous year, was £1984.

The following distribution was made:—

	£	s.
Royal Medical Benevolent Fund—		
Under the 7 years' agreement	1260	0
For general purposes	200	0
Ladies' Guild of the R.M.B.F.—		
For general purposes	200	0
Earmarked for educational grants for the year 1934–35	115	0
Royal Medical Foundation of Epsom College—		
For general purposes	210	0
Further towards endowment of Dawson *Williams Memorial Scholarship*	600	0
Girls' Education Subcommittee	300	0
Royal Hospital and Home for Incurables, Putney	52	10
	£2937	10

The great value to important medical charities of the financial support of the Agency is expressed in the figures. With the allocation this year of a further £3000 (all but) to these purposes the total contribution to medical benevolence of the Agency, since its foundation 25 years ago, is brought up to £35,625 5*s.*

AMIDOPYRIN AND AGRANULOCYTOSIS

FROM a study of the 473 recorded American cases of agranulocytosis, R. R. Kracke and F. Parker[1] have come to the conclusion that the condition may be caused by any drug containing the benzamine group—especially arsphenamine and neoarsphenamine (arsenobenzol and novarsenobenzol), benzene, acetanilide, phenacetin, and amidopyrin (Pyramidon)—acting on a susceptible marrow. They find that the disease is commoner in physicians, nurses, and their relations, than in other people; for instance, it has been observed 50 times more often in doctors than in lawyers, and 200 times more often in nurses than in women school teachers. This peculiar incidence they put down to the fact that those connected with the medical profession are more likely than other members of the community to use this group of drugs. Agranulocytosis appears also to have a curious geographical distribution, most of the cases having been reported in Germany and America, with about 100 in France, whereas the disease is rare in Russia, Poland, and the Far East, and extremely rare in Great Britain. Kracke mentions 6 cases in England compared with a total of 823 in Germany and America. It is suggested that this may be due to variations in the type of drug employed in the different countries. Very few cases are recorded in negroes, and in most of these the onset was preceded by novarsenol therapy.

The Council of Pharmacy and Chemistry of the American Medical Association have been so struck by the possible association between amidopyrin and agranulocytosis that they have issued a special report on the subject by Dr. Paul Reznikoff[2], together with an official comment. Having summarised the recorded cases, Reznikoff concludes that "from the evidence at hand there can be no question that amidopyrine is very important in the production of granulocytopenia. In fact, no other agent has been found, either chemical or bacterial, which has been a factor in causing so many attacks. In the second place no definite case has been reported in which a barbiturate alone is responsible." He agrees that there are definite cases of agranulocytosis in which amidopyrin has never been taken, and that an enormous number of people who take the drug do not develop symptoms. The same is true of arsenobenzol, and clearly sensitiveness in certain patients rather than a universal action of the drug is the explanation of these findings. The Council concurs in Reznikoff's recommendation that indiscriminate administration of amidopyrin is dangerous and should be discouraged. They also draw attention to the large number of proprietary preparations which contain it.

STRUWELPETER-HOFFMANN

JUST as the author of "Alice in Wonderland" eclipsed the mathematician C. L. Dodgson, so the author of the "Struwelpeter" poems has eclipsed a distinguished neurologist and reformer of mental hospitals. It seems unlikely that in 1845, when the poems were published, Heinrich Hoffmann, lecturer in anatomy at the Senckenbergsche Institut in Frankfurt, regarded them as his most convincing claim to fame. Yet his very real services in other directions are now mostly forgotten; and this has led Dr. O. G. Foerster[3] to rescue some of them from obscurity, in celebration of what would have been his 125th birthday on June 13th. Hoffmann, he tells us, was born in Frankfurt, and after studying medicine in Halle and Paris it was to Frankfurt that he returned to take up practice. Here with five friends he founded a clinic for the poor people from the country districts round the town. In 1845, soon after his appointment to the Senckenbergsche Institut, he once more showed his enterprising spirit by starting a medical society. In 1851 he succeeded Varrentrapps as director of the Frankfurt Mental

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[1] Jour. Lab. and Clin. Med., 1934, xix., 799.

[2] Jour. Amer. Med. Assoc., June 30th, 1934, p. 2183.

[3] Münch. med. Woch., June 29th, 1934, p. 985.

Hospital, where he found patients in all stages of mental diseases housed together in insanitary surroundings. The nursing and supervision was bad, and no attempt was made either to cure or to help these unhappy people. After 13 years of strenuous propaganda Hoffmann succeeded in collecting the money to build a new hospital, and when it was opened in 1864 he was elected director. He is said to have treated his patients with endless patience and kindness, and for them, as for his children, he wrote poems and stories and plays. In his professional writings Hoffmann avoided hypothesis, and described rather his own experiences, experiments, and successes. His humorous works include a satire on contemporary fashionable watering-places and spas.

In 1889 Hoffmann retired, but he continued to live in Frankfurt until his death in 1894.

LECTURE NOTES BY KEATS

John Keats was born in October, 1795, and died of phthisis in February, 1821, at the age of 25. In October, 1815, he joined the medical school of Guy's Hospital, and in July, 1816, three months before he came of age, passed the examination of the Apothecaries Society and became a qualified medical man. The next year, 1817, he published his first book of verse to be followed in 1818 and 1820 by further poetry. During his brief life, Keats met with considerable hostile criticism, and his genius was perceived only by the discerning few; but posterity has given him full recognition, and the house at Hampstead where he lived is now a shrine and a museum of relics of the poet. It is to this museum that his anatomical and physiological notebook[1] was bequeathed by Sir Charles Dilke.

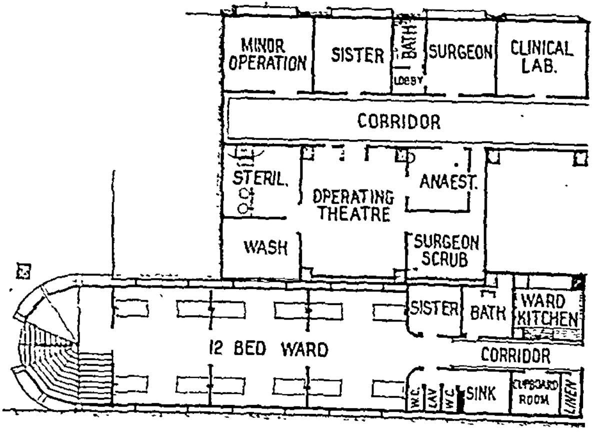
The poetry of Keats was said by Francis Palgrave when professor of poetry at Oxford to be characterised by "Copiousness in exquisite details, and perpetual freshness of phrase . . . Keats is hence a poet especially fit to be read as a bee tastes a flower, a little at a time, and in those pleasant places which he loves and describes so well." A search through his lecture notes fails to reveal these qualities, and it is evident that, like a sensible man, Keats, when attending professional lectures for which no doubt he had paid his fee, confined his attention strictly to business. The notes are interesting because they give some idea of anatomy, physiology, and pathology as taught at the time. The chief lecturer seems to have been "Mr. C.," later Sir Astley Cooper. A lecture on the nervous system gave occasion for the following note: "In diseases medical men guess, if they cannot ascertain a disease they call it nervous." The lecturer also points out that disorder of function may occur without "anatomy being able to discover a corresponding breach of structure." It is interesting to see that atheroma was well recognised, but attributed to "ossification" of the arteries. The condition was known to be the constant effect of age, and it was also known that in the young "a life of intemperance" might lead to it: the site of attack was between the muscular and membranous coats of the artery. The lymphatics at that time were attracting attention and were called "absorbents."

There seems to be only one point about this matter-of-fact little notebook that might give a hint that its owner was a poet. On p. 27 Keats has sketched at the margin of some rather dull notes four little drawings of flowers, one of which is standing in what appears to be a small medicine bottle. This page is reproduced as an illustration, and it has a pathetic interest in view of the following letter cited by Palgrave[2] as written by Keats shortly before his death: "How astonishingly does the chance of leaving the world impress a sense of its natural beauties upon me! Like poor Falstaff, though I do not 'babble,' I think of green fields; I muse with the greatest affection on every flower I have known from my infancy—their shapes and colours are as new to me as if I had just created them with a superhuman fancy. It is because they are connected with the most thoughtless and the happiest moments of our lives. I have seen foreign flowers in hot-houses of the most beautiful nature, but do not care a straw for them. The simple flowers of our spring are what I want to see again."

Sir William Hale-White has had the present notebook reproduced photographically and has presented copies to various institutions including the Royal Society of Medicine and the Keats Museum.

BRITISH INDUSTRIES HOUSE

OUR readers already know that in connexion with the British Industries House a medical section has been organised to afford a prominent display of hospital equipment. The official opening of the medical buying centre is taking place as we go to press (Thursday, July 19th), the inaugural ceremony being performed by Lord Derby, with a reception committee consisting of Lord Dawson of Penn, Lord Horder, Sir Humphry Rolleston, and Sir Holburt Waring. The intention at the British Industries House is to provide showrooms at rates having no close relation to economic return in order that the sale of British productions may be stimulated. With this in view the medical centre has been established, where facilities are provided in one central building for manufacturers to exhibit objects and material used in connexion with hospital equipment and administration, as well as by the medical profession generally. The important underlying hope is that this development of British industry will assist in the reduction of unemployment. From the accompanying plan of the operating theatre and ward block (designed by Messrs. Adams, Holden, and Pearson), which provide a background for many of the exhibits, it will be seen that opportunities will be found in the building for inspection of most features of hospital work.



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[1] John Keats's Anatomical and Physiological Notebook. Edited by Maurice Buxton Forman. London: Humphrey Milford, Oxford University Press. 1934. Pp. 68. 12s. 6d.

[2] Palgrave, F. T.: The Poetical Works of John Keats. Golden Treasury Series. Macmillan. 1892.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XI.—PROGNOSIS OF LOBAR PNEUMONIA

The course of lobar pneumonia is so brief and, in general, its delimitations and its accidents are so well known that in the matter of prognosis it might seem to offer fewer difficulties than other diseases of longer duration or greater complexity. An analysis, however, of the factors influencing prognosis discloses so many variables that to submit secure rules for guidance in the individual case is an impossibility. Nevertheless the experience of generations, statistical studies, and a close attention to the natural history and varying circumstances of the disease have, between them, provided us with much useful information.

The factors influencing prognosis may be divided into two categories, the general and the particular; those concerned with the disease as a whole, and those concerned with the disease as witnessed in the individual patient.

GENERAL FACTORS

In the first category we must consider broadly the observed facts relating to mortality. With morbidity we need have small concern, for the vast majority—probably 90 per cent.—of patients who recover from lobar pneumonia do so completely. It has long been appreciated that the mortality of pneumonia varies considerably with country, social environment, epidemic, age, preceding ill-health, and constitutional states, and we now know that the type of invading organism also plays its part. Pneumococcus type III. has the highest virulence, but types I. and II. account for two-thirds of all cases and of these type II. gives the higher mortality.

The general mortality as gauged by hospital figures in England and Scotland lies between 15 and 20 per cent. At Guy's Hospital during the nine years ending in 1930 the mortality between the ages of 13 and 75 years was 16 per cent. (Ryle, J. A., and Waterfield, R. L.: Guy's Hosp. Reports, 1933, lxxxiii., 389). One-third of the deaths occurred over the age of 50. There were no deaths between the ages of 15 and 20. The experience of consulting physicians in private practice is fallacious, as they are naturally called to the more anxious cases; Osler gave the mortality in his personal practice as approaching 50 per cent. (Amer. Jour. Med. Sci., 1897, cxiii., 1). In general practice the mortality-rate is lowest, and Osler, quoting the report of the collective investigation committee of the British Medical Association, which was based chiefly on such practice, gave it as 12 per cent. In the case of picked populations low figures are also the rule, and A. Abrahams (THE LANCET, 1920, ii., 543) showed the mortality for lobar pneumonia among the troops at Aldershot, during the war, to be only 10 per cent. Here the patients were mostly young, selected men, and they were immediately removed to hospital on falling sick. In France during the same period A. Malloch and J. H. Rhea (Jour. Royal Army Med. Corps, 1918, xxxi., 300) found a general mortality of 26·1 per cent. at a base hospital, with a higher rate among cases coming long distances by convoy or hospital-train, thereby confirming the general opinion in regard to the ill-effects of transferring cases excepting for short distances and in the earliest hours of the disease.

It is interesting to compare with these figures the higher rates of mortality in America, and the variations there in accordance with the class of patient studied. The mortality at the Rockefeller Hospital, according to R. L. Cecil (Brit. Med. Jour., 1932, ii., 657), is 19·5 per cent.; at the Bellevue Hospital, draining the poor areas of the city, 35·8 per cent. Writing in 1897 Osler (see above) gave the figures for the Montreal General Hospital as 20·4 per cent. and for the Charité Hospital, New Orleans, as 38 per cent. For comparison he quoted Leech's figures for British hospitals which showed a mortality of 20 per cent. at St. Thomas's Hospital, 18·6 per cent. at St. Bartholomew's, and 27·1 per cent. at the Edinburgh Royal Infirmary.

After the period of infancy the mortality of lobar pneumonia is almost negligible until adult life. Osler quotes figures between 1·9 and 3·3 per cent. In adult life it rises steadily, with a steep peak after 50 years, and in the seventh decade it is in the neighbourhood of 70 per cent. Alcoholism, obesity, diabetes, nephritis, and a recent operation all load the scales against recovery. In the recent Guy's series quoted above a general mortality of 16 per cent. is reduced to 10 per cent. if cases so handicapped and cases with serious pneumococcal complications are excluded.

It is extremely difficult to assess the influence of treatment on mortality, but early attention and good nursing in a favourable environment and without moving must partly account for the better figures of general practice as compared with any hospital series.

Recent figures collected by the Therapeutic Trials Committee of the Medical Research Council (Brit. Med. Jour., 1934, i., 241) suggest that between the ages of 20 and 40 and employing serum of appropriate type as early as possible in the disease an appreciable reduction in mortality may be achieved. With older patients and septicæmic cases the results of serum therapy are disappointing. In childhood and the adolescent period it is seldom necessary.

PARTICULAR FACTORS

Turning to prognosis in the individual we have already recognised that youth and good environment are favourable, and poor conditions and advancing years unfavourable, and that a history of alcoholism and the presence of a chronic disease or degenerative changes are strongly adverse. Of bed-side symptoms, cyanosis is adverse, delirium by no means necessarily so. Wide extent of lung-involvement, more particularly when it is bilateral, is frequently, but not invariably, of bad import. A low and especially a falling blood pressure is unfavourable. Among the more useful prognostic observations the pulse-temperature-respiration ratio should, perhaps, be given special place. A high temperature, short of hyperpyrexia, need not be disconcerting. Where parallelism between the curves of temperature, pulse, and respiration-rate is maintained or pulse and respirations are low in proportion to the temperature, the auguries may be considered good. A falling temperature with a rising pulse and respiration-rate is definitely unfavourable. A moist tongue, easily won sleep, and well-taken nourishment are encouraging signs. Restlessness and insomnia are unfavourable. A high leucocyte count in the neighbourhood of 20,000 cells per c.mm. is generally favourable, and a failure of leucocyt[illegible] ble, but, useful as it is, no abso[illegible] placed on this single prognostic test, and with intermediate figures the contribution of other clinical signs is more to be trusted. When the leucocytes range very high, say in the neighbourhood of 30,000 cells per c.mm., the likelihood of empyema must be kept in view. In a certain proportion of cases the pneumococcus can be grown from the blood stream; this finding is not necessarily adverse, but it may indicate a septicæmic state, in which event prognosis is definitely bad.

Certain complications are of greater gravity than others. Empyema developing after the crisis and beyond the period of infancy has a favourable outlook. Empyema in infancy and syn-pneumonic empyema give a high mortality. Pericarditis and meningitis usually foretell a fatal termination, but occasional recoveries are recorded.

Prognosis is especially difficult during the first two or three days of the disease, the very stage at which an accurate forecast is most desirable. In this phase we must needs rely chiefly upon our knowledge of the patient's age, type, habits, and antecedents. Osler's dictum that "the toxæmia outweighs all other elements in the prognosis of pneumonia" remains sound, and yet the assessment of the degree of the toxæmia, as apart from the effects of fever, extent of lung-involvement, fatigue, and dehydration, may tax the most experienced and physicianly mind. The aspect of the patient, the state of his skin, the state of the capillary circulation, and the "quality" of the pulse, difficult though they be to record or describe, here lend their quota to aid maturer judgments.

CONCLUSION

In summary, a good prognosis may generally be offered with some confidence in the childhood and adolescent period. Up to and above 50 the chances of death or recovery gradually become more evenly balanced; in the fifth and sixth decades the recovery-rate is in the neighbourhood of 60 per cent. After 70 years the chances of recovery fall to nearly one in four. The lean patient has a better prospect than the stout, the temperate than the intemperate. The pulse-temperature-respiration ratio and the leucocyte count taken in conjunction with other clinical signs have distinct value in prognosis. The knowledge that the disease runs a natural course but little swayed by therapeutics does not justify inaction, for it cannot be doubted that good management, without undue interference, and with or without specific aids, continues to save lives.

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SPECIAL ARTICLES

A PROVISIONAL STABLE STANDARD FOR ANTIPNEUMOCOCCUS SERUM, TYPE II.

AND ITS PRACTICAL APPLICATION

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THROUGH the generosity of Dr. Lloyd D. Felton, of the Harvard University Medical School, workers in different countries have been provided with a liquid bivalent antipneumococcus serum, F. 146, by means of which the type I. and type II. antibody content of antipneumococcus sera have been assayed. Felton assigned unit values to his serum, F. 146, and laboratory workers and physicians have become accustomed to the units which he proposed. In view of the fact that the serum, F. 146, is a liquid and, therefore, cannot be expected to retain its potency indefinitely, and since further supplies are no longer available for distribution, it is clearly desirable to give greater permanence and stability to the standards and units for these pneumococcus antibodies. To this end, a dry stable standard for antipneumococcus serum, type I., was prepared in this institute (Hartley et al., 1933) and assayed, as accurately as the methods at present available allow, in terms of the type I. component of the liquid serum F. 146: it was established that 0·0886 mg. of the dry stable standard for antipneumococcus serum, type I., is equivalent to the unit for this antibody as originally proposed by Felton.

The present report concerns the preparation and assay of a dry stable standard for antipneumococcus serum type II. The work has proceeded on lines similar to those followed for the preparation of the standard for type I., and with similar objects. The dry standard for type II. has been assayed in terms of the type II. component of the liquid serum, F. 146. We understand (1933) that serum F. 146 is held to contain 200 units of type II. antibody per c.cm.; on the basis of this unitage, 0·0894 mg. of the dry stable standard which we have prepared is equivalent to the unit originally proposed by Felton for the type II. pneumococcus antibody.

Preparation and Properties of the Dry Standard

The dry standard was prepared from a monovalent type II. antipneumococcus horse serum. Preliminary tests showed that the serum possessed high protective potency, and a high precipitation titre for the homologous specific soluble substance. Five cubic centimetre quantities of the serum were delivered, by means of a precision distribution apparatus, into a series of dry sterilised ampoules, dried to constant weight and sealed, the procedure followed being exactly similar to that described in the preparation of the dry stable standard for the type I. antibody (Hartley et al., 1933). The whole of the ampoules, amounting to 160 in all, are stored continuously in the dark at −2° C. to −4° C.

The sterility of the product was shown by aerobic and anaerobic cultural tests made on ampoules selected at random both before and after desiccation. The weight of the total solids in fourteen ampoules, selected at random, were found to be 0·4473 g.; 0·4473 g.; 0·4488 g.; 0·4476 g.; 0·4488 g.; 0·4489 g.; 0·4489 g.; 0·4507 g.; 0·4501 g.; 0·4487 g.; 0·4461 g.; 0·4492 g.; 0·4464 g.; 0·4446 g. The mean weight is, therefore, 0·4482 g.

The dried serum is reconstructed for use in exactly the same way as for the type I. standard, by the addition of 5 c.cm. of sterile distilled water to the contents of each ampoule. The product does not dissolve completely, a slightly turbid solution being obtained, from which, on standing, a fine white solid settles to the bottom of the ampoule. An attempt was made to determine the amount of insoluble material by weighing the quantities remaining undissolved in each of seven ampoules; the amount of insoluble material was found to be very small indeed, the average for the seven ampoules being 0·65 mg. For most of the tests in which the standard is used, therefore, the insoluble material may be disregarded, but, for precipitation tests, it is advisable to remove it by centrifugalisation.

A solution of the standard in 66 per cent. glycerol saline has been prepared for distribution to laboratories and institutions. Each 25 c.cm. of this solution contains the total solids of one ampoule, so that its potency is one-fifth of that of the solution of the standard when reconstructed by the addition of 5 c.cm. of sterile distilled water.

Comparison of Dry Standard and Serum from which it was Prepared

Precipitation tests, carried out on the reconstructed dry standard and the undried parent serum, indicated that desiccation had resulted in a loss of potency amounting to about 25 per cent. and the results of two separate mouse protection tests led to the same conclusion. Such a change has hitherto been unknown in this laboratory where many sera have been reduced to absolute dryness by the same method. There is no reason to suppose, however, that any further alteration will occur, since the serum has been dried to constant weight and each ampoule, before sealing, was filled with pure dry nitrogen gas and then evacuated; furthermore, the sealed ampoules are stored continuously at –2° C. to –4° C. No evidence of further change, since the preparation was completed, has been obtained in many precipitation and mouse protection tests.

Comparative Tests of Dry Standard Serum and Serum F. 146

The relative potencies of our reconstructed dry standard and serum F. 146 were compared by repeated precipitation and mouse protection tests.

(*a*) *Precipitation tests.*—The following optimal precipitation ratios (W. Smith, 1932) were obtained, using the soluble specific substance from type II. pneumococcus.

F. 146 .. .. .. = 1 : 23,000
Reconstructed dry standard = 1 : 4,500

These results suggest that the reconstructed standard is five times as potent as F. 146.

TABLE I

Summary of the results obtained in four experiments in which the standard serum was compared with serum F. 146.

Culture dose = 0·01 c.cm. in each experiment

Dose of recons. st. (c.cm.).	Dose of F. 146 or G.s. of st. (c.cm.).	Exp. 1.		Exp. 2.		Exp. 3.		Exp. 4.	
		Dry st.	F. 146.	Dry st.	F. 146.	Dry st.	F. 146.	G.s. of st.	F. 146.
0·000156	0·00078	100·0	100·0	..	..	..	..	95·0	89·5
0·0003125	0·00156	85·0	90·0	91·7	58·3	60·0	65·0	80·0	83·3
0·000625	0·003125	77·5	42·5	44·0	47·8	17·5	30·0	37·5	33·3
0·00125	0·00625	35·0	42·5	4·0	12·0	22·5	7·5	7·5	27·7
0·0025	0·0125	17·9	22·5	0	8·0	10·0	2·5	5·3	7·5
0·005	0·025	5·0	0	0	4·0	5·1	2·5	5·3	5·0
0·01	0·05	0	0	..	..	..	..	5·0	0

Recons. st. = reconstructed standard; G.s. of st. = glycerol solution of standard.
The figures represent percentage mortalities in groups of mice.

(*b*) *Mouse protection tests.*—Three separate tests were made in which serum F. 146 was compared with the reconstructed standard, and one test in which F. 146 was compared with the glycerol solution of the standard. Reference may be made to earlier work for a full description of the method of the test (W. Smith, 1932); suffice it to say here that in each experiment either five or seven doses of each serum, with 20 or 40 mice per serum dose, were employed. Following the indications given by the precipitation ratios, the doses of F. 146 were five times the corresponding doses of the reconstructed standard serum, whilst in the comparison between F. 146 and the glycerol solution of the standard identical doses were used. The results of all the tests are summarised in Tables I. and II.; they indicate that serum F. 146 is equal in potency to the glycerol solution of the standard and has one-fifth the potency of the solution of the dry standard serum obtained by the addition of 5 c.cm. of sterile distilled water to the contents of one ampoule.

TABLE II

Giving the "summed" results of the four comparative tests of the standard serum and F. 146

Dose of recons. st. (c.cm.).	Dose of F. 146 or G.s. of st. (c.cm).	Standard.		F. 146.	
		Deaths. / Number injected.	Mortality per cent.	Deaths. / Number injected.	Mortality per cent.
0·000156	0·00078	39/40	97·5	37/39	94·9
0·0003125	0·00156	79/104	76·0	73/102	71·6
0·000625	0·003125	64/145	44·1	53/142	37·3
0·00125	0·00625	27/145	18·6	33/141	23·4
0·0025	0·0125	13/142	9·1	15/145	10·3
0·005	0·025	4/103	3·9	3/105	2·9
0·01	0·05	1/40	2·5	0/40	0

Application of the Dry Standard in Biological Assay

The following experiment provides an illustration of the practical application of the standard in the biological assay of antipneumococcus serum, type II. Through the courtesy of Dr. G. W. McCoy, director of the National Institute of Health, Washington, we have been supplied with a quantity of an antipneumococcus serum, P. 11, with a request that its potency should be determined in terms of the dry stable standard which we have prepared. It was stated that this serum was proposed as a tentative control serum for use in the United States, and that it contained from 150 to 200 type II. units per c.cm., thus being of approximately the same potency as serum F. 146.

TABLE III

Showing the results of a potency test of antipneumococcus serum, P. 11, in comparison with the dry standard serum

Culture dose = 0·01 c.cm. in each experiment

Recons. dry st. (c.cm.)	P. 11 (c.cm.).	Group mortality.		Mortality (per cent.).	
		St.	P. 11.	St.	P. 11.
0·000156	0·00078	40	39	100·0	98·0
0·000312	0·00156	39	38	98·0	95·0
0·000625	0·00312	33	34	82·5	85·0
0·00125	0·00625	21	14	52·5	35·0
0·0025	0·0125	7	9	17·5	22·5
0·005	0·025	2	2	5·0	5·0

A preliminary test indicated that the potency of P. 11 was about one-fifth of the potency of our reconstructed serum. A second test was then carried out in which six different doses of each serum were tested against a constant dose of virulent type II. pneumococci, 40 mice being used for each serum dose and a total of 480 mice being used in the test. The doses of P. 11 used were five times the corresponding doses of the reconstructed dry standard. The results of the comparative tests are summarised in Table III.; they indicate that the potency of serum P. 11 is one-fifth of the potency of our reconstructed dry standard; or, expressed in terms of the unit proposed by Felton, 1 c.cm. of P. 11 contains 200 type II. units. This result, considering the limitations of the mouse-protection method of testing, is in very good agreement with the values obtained for the serum, P. 11, in other laboratories.

Discussion

The results summarised in Tables I. and II. suggest that the assay of antipneumococcus serum, type II., is less precise than the assay of type I. antiserum. In order to obtain the same order of accuracy for type II. as for type I., a wider range of serum doses and a greater number of mice may be necessary. The results also emphasise the great advantage which a satisfactory in-vitro method—if such could be evolved—would possess over the mouse protection test.

The correlation between the precipitation and mouse protection values of the type II. standard serum and the type II. component of serum F. 146 is very close. The value of the precipitation test is further exemplified by the experiments in which loss of potency during desiccation was demonstrated. We take this opportunity of stating, however, that the limitations of the precipitation test found for type I. serum assay apply equally to the case of type II. sera; there are some sera and concentrated antibody solutions which fail to show a close correlation between their precipitation and mouse protection values.

The frequent request by laboratory workers for supplies of the standard for antipneumococcus serum, type I., indicate that this standard preparation, which was made available in 1933, is already proving of practical value. There is reason to believe that a dry, stable standard for antipneumococcus serum, type II., will be similarly useful. By its use the results obtained in laboratories and hospitals throughout the world can be directly compared. Not the least of its uses is in the further study of the methods of assay of the type II. antibody which, at the present time, lack precision. Two classes of variables inherent in the mouse protection test—namely, those of the test animals and those of the living culture of pneumococci—are not easily controlled; but the variable introduced by the instability of a liquid antiserum as the standard of reference can be entirely eliminated by the use of a dry, stable standard preparation.

The definition of a unit for antipneumococcus serum, type II., has not yet been internationally adopted; it is suggested that, pending such a decision, the unit proposed by Dr. Felton should be provisionally accepted as the basis of measurement for the type II. pneumococcus antibody. One such unit is contained in 0·0896 mg. of the dry standard antipneumococcus serum type II. which we have prepared.

The standard is freely available to all workers who desire to make use of it by application to the Department of Biological Standards, the National Institute for Medical Research, London, N.W.3.

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OCCUPATIONAL THERAPY

A ONE-DAY conference on occupational therapy organised by the National Council for Mental Hygiene was held at Mansion House on July 11th. In the afternoon Sir HENRY GAUVAIN, from the chair, defined occupational therapy as "occupation carried out under direct medical control and supervision with a definite therapeutic object." It should be prescribed, he said, in the same way as medicines with regard to the requirements of the individual patient. The movement was of recent development, and in this country we were merely on the fringe of the subject. The value, both psychological and physical, of occupational treatment for all persons whose infirmities necessitated a prolonged sojourn in hospital or institutional environment was daily becoming more apparent.

IN PHYSICAL DISORDERS

Dr. J. B. MCDOUGALL, medical director of the British Legion Village, Preston Hall, gave an account of the trades and industries carried on there. The effect on the morale and general health of the men he described as amazing. Owing to the relative permanence of the patient population many highly skilled workers had been trained there, and by good organisation and good salesmanship the industries had also proved a paying proposition.

Dr. VERONICA DAWKINS, resident medical officer, Malting's Farm Sanatorium, Nayland, discussed the possibilities and limitations of occupational therapy in a sanatorium with a relatively shifting population. She laid stress on the value of handicrafts, and described a régime carefully graded according to the patients' capacity for work and exercise. In addition to handicrafts patients assisted in the utility services of the sanatorium, but all work was carefully individualised and carried out under constant medical direction.

Mr. H. J. SEDDON, medical superintendent, Royal National Orthopædic Hospital, Stanmore, stressed the importance of occupational therapy in re-educating crippled limbs, as well as its psychological effects. Controlled occupation was one of the greatest advances in therapy of modern times.

In the subsequent discussion the speaker dwelt on the value of occupation even when the period in hospital was only a few weeks.

IN MENTAL AND NERVOUS DISORDERS

In the evening, Dr. NATHAN RAW presiding, the discussion centred round occupational therapy for patients with mental and functional nervous disorders. Mrs. ELEANOR SLAGLE, secretary and founder of the American Occupational Therapy Association, said that this organisation has official recognition, and supplies trained workers to all the principal Government institutions for mental illness and mental defect in the State of New York. It also supplies workers to mental hospitals and defective colonies in numerous other States. Workers properly trained on a definite syllabus were needed; the half trained were of little use. The course in her school took two years, and included not only training in handicrafts but practical experience in their application. A considerable proportion of the nurses should have sufficient knowledge to supplement and assist the work in the wards, and, since the coöperation of the nursing staff was essential, nurses in America were given a short course of special training in occupational therapy. In the schizophrenic type of patient whose habits had deteriorated and who, if left alone would sit silent and unoccupied, slowly dementing, the value of habit training and the reawakening of interest produced by supervised occupation could hardly be over-estimated. She was convinced that treatment which brought each patient into contact with reality and obliged him to attempt to live a life approximating to the normal was a valuable weapon in mental treatment.

Dr. J. R. **Rees**, medical director of the Institute of Medical Psychology, said how greatly he had been impressed by the occupational therapy organised in American mental hospitals. It was proposed to start a school of occupational therapy in connexion with his institute. He was convinced of the value of handicrafts in the treatment of the psychoneuroses, even for out-patients.

Dr. **Elizabeth Casson**, medical director, Dorset House School of Occupational Therapy, Clifton, described the régime at her school which was connected with a home for patients suffering from functional nervous disorders, so that students were enabled to study the therapeutic application of handicrafts there, as well as in the local mental hospitals. She was convinced of the immense therapeutic value of a time-table of exercise, occupation, amusement, and rest in the treatment both of the psychoses and psychoneuroses. Nothing was worse for patients than to drift about aimlessly. A modification of the Dutch and American types of occupational therapy would probably be found best suited to English people. She was convinced that the demand for trained workers would increase as their value came to be more fully appreciated.

Dr. **Norah Haworth**, assistant medical officer at Severalls Mental Hospital, Colchester, distinguished between the employment of handicrafts in the wards and in a special occupation centre, and occupation in the utility services of the hospitals. The latter undoubtedly had a useful place in treatment provided that the occupation was fitted to the patient and not vice versa; for example, it was quite a different matter whether a patient is drafted into the laundry because she shows a special inclination for some branch of laundry work, or because there happens to be a shortage of laundry hands. She agreed with Mrs. Slagle, who had said that plaiting and weaving made an almost universal appeal. Hospitals' committees naturally required to be convinced that money was being usefully expended. A well-organised handicraft department should become almost, if not quite, self-supporting. It was of no help to the patients to be allowed to produce sloppy and badly finished articles, but the work done should, however, be carefully suited to the capacities of the patient. If committees realised that properly organised occupation was really a therapeutic measure they would be well advised not to count the cost, as it would tend to be off-set by an improvement in the recovery-rate, and in the quietude and improved behaviour of the patients. Even acute cases could sometimes be made peaceable and happy by suitable occupation.

Miss **Ruth Darwin**, a senior commissioner of the Board of Control, said that coöperation was needed from four angles: (1) the medical superintendent and his assistants; (2) visiting committees; (3) nursing staff; (4) occupation teachers. She hoped that in the near future many more medical superintendents would come to appreciate the value of occupation therapy. She was convinced that it would soon become a sine qua non of a well-conducted modern mental hospital. Occupation to be really successful must not be confined to a special room or an hour, two or three times a week, but carried on daily in the ward, and thus the nurse had an enormously important part to play. It appeared to be a psychological necessity for all humanity, whether mentally sick or mentally sound, to have some occupation with an object, and occupational therapy did not consist merely in running a needle aimlessly through a little piece of leather. If any benefit was to accrue to the patient it was essential to make him appreciate that the work must be of high enough quality to make it of real use.

MEDICINE AND THE LAW

Patient's Ambulance Journey after Childbirth

On May 12th a patient died at Crumpsall Hospital within a few hours of having been transferred from St. Mary's Hospital, Whitworth-street, Manchester, where she had just been delivered of a child. The circumstances attracted local publicity and criticism, and a committee was appointed to investigate and report. The five members of the committee included two professors of obstetrics, Prof. Miles Phillips, of Sheffield, and Prof. W. Fletcher Shaw, of Manchester. Their report exonerates the two hospitals, and, while they disclaim any authority to generalise, it obviously touches matters of some general importance. There was fortunately no divergence between the patient's relatives and the hospital witnesses on any material question of fact. Mrs. Taylor, the patient, an insured person entitled to maternity benefit, attended on April 7th at St. Mary's Hospital, Whitworth-street, where she was examined. She paid a voluntary contribution of £2 towards the expense of her confinement (expected on May 16th) at the hospital. The printed form of acknowledgment contained the following words, apparently on the back of the document: "Important. Come immediately to the hospital as soon as labour commences. In case the hospital is full the best arrangements possible in the interests of the patient will be made." The committee's report establishes the fact that neither the patient's husband nor her mother had read this printed warning. One general conclusion to be drawn from the case is that all possible steps should be taken to bring such a warning to the careful attention of the patient and of others concerned. Mrs. Taylor's condition in April was normal and satisfactory. On May 11th she felt unwell at 1 P.M., and labour undoubtedly began, but she did not go to the hospital at once. Her mother told the committee: "I purposely kept her waiting so that they could not send her back again." Later, at 5 P.M., her mother urged her to go to the hospital but the patient was unwilling. Ultimately at 5.40 Mrs. Taylor and her mother went together by tramcar to the hospital, arriving at 6 P.M. No inquiry had been made by telephone or otherwise as to whether a bed was available. As it happened, one ward, containing one-fifth of the total beds, was closed for painting and cleaning; every bed in every available ward was occupied, and there were two emergency beds occupied in each ward. The accommodation was not only full but overcrowded. An examination of Mrs. Taylor by a house surgeon, assisted by a nurse, had indicated that labour would continue for some hours. The congestion in the hospital was explained to the patient and her mother. Mrs.

Taylor was advised that it would be best for her to go to the Crumpsall Hospital; she was quite well, she acquiesced and an ambulance was ordered. In the succeeding 20 minutes events rapidly developed, and a child was born in the room where she had been examined, a room attached to the out-patients' department. The house surgeon and an experienced resident obstetrical surgeon were promptly in attendance and, notwithstanding the precipitate nature of the confinement, the patient's condition was good. She was cheerful and appeared quite unperturbed by the idea of being removed to Crumpsall Hospital. The obstetrical surgeon satisfied himself that there was no birth injury, and that Mrs. Taylor was in a fit state to be moved. At 7.25 P.M. the ambulance took Mrs. Taylor and her child with her mother and a nurse to Crumpsall Hospital where they arrived 15 minutes later. The patient was there placed in a maternity ward; she was none the worse for the journey; the nurse went back and the patient's mother returned home. Mrs. Taylor was now continuously under observation and careful treatment. At 9 P.M. the ward sister was called to her and was surprised to find obvious signs of shock. The house surgeon saw her and advised measures which were adopted and led to some improvement, but at 2 A.M. her condition became such that her relatives were sent for; she grew worse, and she died at 4.25 A.M. The committee states that at both hospitals the treatment was prompt and efficient, and that it was not for want of proper attention that Mrs. Taylor died: there being no possible accommodation at St. Mary's Hospital, the right course was to remove the patient to Crumpsall Hospital. There has naturally been public uneasiness on the general question whether it is safe and right to move a patient, either while in labour or immediately after the birth of a child, from one place to another by ambulance. The answer given by the committee, and supported by numerous statistics from hospitals of the highest efficiency, is that such removal is frequently necessitated by various circumstances, and is usually carried out with great advantage to the patient. "We find no reason to believe that in this instance a journey lasting only 15 minutes in a first-class ambulance was in any way responsible for the death of the patient." The cause of Mrs. Taylor's death the committee finds itself unable to state with certainty. After hearing the evidence of medical witnesses and particularly that of Prof. Leyland Robinson, professor of obstetrics and gynæcology in the University of Liverpool, the committee thinks that death was due to delayed obstetric shock, a rare condition which more commonly follows difficult and prolonged than simple and unassisted labours. This condition, says the committee, does rarely occur after normal labour even in the most favourable circumstances, but there are usually warning indications of its possible advent. It would not perhaps occur to a patient to inquire by telephone if accommodation was available before going to the hospital. Had such an inquiry been made in good time in Mrs. Taylor's case, it might have been possible to arrange for her to go direct to the Crumpsall Hospital.

Sarcoptic Mange Infection

In an action heard before Mr. Justice Acton on July 10th a plaintiff claimed damages for personal injuries alleged to be due to breach of warranty on the sale of a bull-dog pup. The plaintiff's case was that the pup developed sarcoptic mange three days after the purchase and that she herself contracted the same disease a few days later. She complained also that the consequent sulphur treatment had caused dermatitis, affecting her back, chest, and face. The medical evidence included that of her own doctor who said he had diagnosed sarcoptic mange by the characteristic papillary red vesicles and the absence of burrows typical in scabies. Dr. Arthur Whitfield was also called. He estimated that he had seen a hundred cases of sarcoptic mange since the war. The disease, he said, could be contracted by human beings from cats or dogs. It might develop within six days of contact with an infected animal. It was to be distinguished from scabies by the absence of burrows. It was difficult to isolate the parasite of sarcoptic mange, though not impossible, for he had himself done so. He agreed that excessive use of sulphur would produce dermatitis, the effective amount varying with different persons. At the close of the plaintiff's case the claim was settled, the defendant paying her £100.

ROYAL COLLEGE OF SURGEONS CONVERSAZIONE

THE surgeons of England on Wednesday of last week emulated the physician's art, formulating a prescription for an evening's entertainment of which the ingredients were nicely balanced. The basis of the prescription was the incitement to further effort in research provided by the varied exhibits, some grave in pathological implication, others gay as feathers of cock and hen combined; an adjuvant was supplied by appropriate lecture-demonstrations in the theatre; the mixture was given proper form and colour by the dignity of the vehicle, the stately rooms of the College; while the whole was made palatable by a well-furnished buffet. This formed an attractive meeting-place for those whose bias for the evening was social rather than technical, and certainly was one of the most if not the most popular exhibit.

It seems unlikely that any one guest found time to visit all the demonstrations, of which nearly 50 were set out, but none could come away without an increased respect for the energy with which research, especially cancer research, is being prosecuted to-day, and for the degree of coördination achieved between the agencies for its promotion. The following exhibits and demonstrations were on view:—

Imperial Cancer Research Fund.—Effect of radium on spontaneous mammary carcinomata which differ greatly in their radiosensitivity; demonstration of the presence of reducing substances in malignant tumours: evidence for the existence of hæmopoietic and cancer-accelerating factors in liver: cancer in mice and rats induced by pinene tar which is the most potent of known carcinogenic agents; the progressive growth after transplantation of a benign tumour of the rat; the technique of micro-incineration—the burning out of the organic compounds in sections of tissues at high temperatures.

Strangeways Research Laboratory, Cambridge.—The control of growth in tissue cultures by radiation: the effect of gamma rays on the whole embryo chick; experiments on wound-healing in vitro.

Stroud Laboratories, Mill Hill (Imperial Cancer Research Fund).—Growth and spread of filtrable tumours of the fowl; living cultures of normal and malignant cells under dark-ground illumination and after vital staining.

Research Institute of the Cancer Hospital (Free).—Microscopic specimens illustrating the development of carcinoma of the mamma in a castrated male mouse under the influence of œstrin: specimens of cancer-producing pure chemical compounds all being of the same chemical type and all but one derived from the parent hydrocarbon, 1:2-benzanthracene; specimens illustrating the application of fluorescence spectroscopy to the isolation of the active substance present in a cancer-producing material of industrial importance—namely, pitch.

Middlesex Hospital Research Laboratories.—Filtrable tar-induced tumours of the fowl; the action of synthetic œstrogenic and synthetic carcinogenic compounds (in association with the Research Institute of the Cancer Hospital (Free).)

Other exhibits were set out by various departments of the College and the Buckston Browne Surgical Research Farm. These included books and manuscripts illustrating the history of cancer and cancer research from 1589 onwards; reconstructions from the fragments of the skull of Piltdown man; demonstration of fossil and other prehistoric human remains, specimens of experimental and clinical work on thoracic surgery, surgical shock, and dilatation of the œsophagus and teratomata; and a new technique for dealing with paralysis of the facial nerve in man. The National Institute for Medical Research showed simple and sensitive methods for detecting the presence of acetycholine in body fluids; also some of the appliances now in use for photographing virus bodies with ultra-violet light as the invisible illuminant. St. Bartholomew's Hospital Surgical Unit showed arteriograms following injection of thorotrast; drawings illustrating the effects of irradiation on cancer of the tongue; radiograms of various types of diaphragmatic herniæ and diagrams and drawings illustrating hyperparathyroidism and Raynaud's disease. The department of physics of this hospital exhibited a new type of radiation detector, and demonstrated a newly discovered chemical effect of radiation. The anatomy department of St. Thomas's Hospital Medical School showed how retinal localisation, sharply defined, in the lateral geniculate body had been established in monkeys.

THEATRE DEMONSTRATIONS

In the course of the evening two theatre demonstrations were given to very large audiences. Dr. J. A. Murray, F.R.S., showed as a film a moving diagram of the mode of local extension of skin cancer. The initial focus is small and grows from its own resources. Extension may be by fusion of adjacent independent foci. If these develop at intervals at the periphery during the growth of a slowly growing tumour, the impression of a continuous transformation at the margins of a growing cancer may be produced. Prof. John Cunningham McLennan, F.R.S., demonstrated various aspects of the work in progress in connexion with beam therapy research at the Radium Institute.

BEIT MEMORIAL TRUST FOR MEDICAL RESEARCH

A MEETING of the Trustees of the Beit Memorial Fellowships for Medical Research was held on July 12th for the election of Fellows and other business.

The Trustees expressed their deep regret at the death on July 3rd, at the age of 82, of their senior colleague, Sir James Kingston Fowler. For 21 years in his double capacity of trustee and hon. secretary Sir James had given devoted service to the welfare of the Trust, and when enfeebled health made it necessary for him to relinquish the secretarial duties he still watched closely as trustee the progress of the work which owed so much of its success and even of its existence to his creative powers. His eager care in fostering the aims of the Trust rivalled that of the founder himself, Sir Otto Beit, during the 20 years in which the latter lived to preside as chairman of the trustees.

Fellowships through the year 1933–34 were held by 24 workers. Among the distinctions gained by past and present Fellows during the year were the appointment of Prof. E. Mellanby, F.R.S., as secretary of the Medical Research Council, and Dr. Henry Cohen to the chair of medicine in the University of Liverpool. Dr. Helen Mackay was elected to the Fellowship of the Royal College of Physicians of London, being the first woman to be thus honoured. Dr. Dorothy Russell gained the Hunter medal and triennial prize of the Royal College of Surgeons of England, and Dr. Janet Vaughan the triennial Liddle prize of the London Hospital. Dr. Maurice Stacey earned an unusual distinction as first year Fellow in being awarded the Meldola prize of the Institute of Chemistry.

The following elections to Fellowships were made:—

Fourth Year Fellowships

ROBERT HILL, M.A. Camb. To continue his research *on the properties of hæmoglobin and cytochrome. At the* Dunn Institute of Biochemistry and Molteno Institute, University of Cambridge.

LEONARD HUBERT STICKLAND, M.A., Ph.D. Camb. To continue work on the metabolism of the strictly anaerobic bacteria of the genus Clostridium. At the Dunn Institute of Biochemistry, University of Cambridge.

Junior Fellowships

SOLLY ZUCKERMAN, D.Sc. Lond., M.R.C.S. Eng. Rockefeller *Research Fellow, Yale University,* 1933–34. Proposed research: Experimental study in animals of the neurovascular control of reproductive functions. At the Department of Human Anatomy, University of Oxford.

HAROLD WILLIAMS FULLERTON, M.B. Aberd. Rockefeller Research Fellowship, Boston, U.S.A., 1933–34. Proposed research: The ætiology and treatment of hypochromic anæmia of women of the poor classes. At the Department of Medicine, University of Aberdeen, and the Rowett Research Institute, Aberdeen.

EMANUEL MANNIE LOURIE, M.B. Lond., D.P.H., D.T.M. & H. Eng. Rockefeller Research Fellow, University *of Chicago,* 1931–33. Proposed research: Studies on chemotherapy in protozoal disease. At the Liverpool School of Tropical Medicine.

JOSEPH STANLEY MITCHELL, 1st class Parts I. and II. Natural Science Tripos; M.B. Camb. Queen's Scholar, Birmingham University, 1932. Proposed research: The *effects of radiation on thin protein films* At the Laboratory *of Colloid Sciences,* University of Cambridge.

DAVID EZRA GREEN, M.S. New York, Ph.D. Camb. Research Student at Cambridge. Proposed research: *The effect of hormones and vitamins upon the metabolism* of individual organs. At the Institute of Biochemistry, *University of Cambridge.*

GORDON ALLISON GRANT, M.Sc. Dalhousie, Ph. D. Toronto. Royal Society of Canada Research Fellow, at Lister Institute, London, 1933–34. Proposed research: The metabolism of galactose and the physiological synthesis of lactose by the active mammary gland. At the Lister Institute of Preventive Medicine, London.

STUART LAWSON COWAN, B.Sc. Lond. Research worker, Department of Pharmacology, University College, London, 1932–34. Proposed research: To continue study of the chemical exchanges occurring in crustacean nerve, as a result of stimulation and oxygen want: to study the blood flow through the kidney during diuresis. At the Pharmacology Laboratories, University of Cambridge.

MAURICE JOWETT, B.Sc., Ph.D. Liverp. Assistant Research Chemist, Biochemical Laboratory, Cardiff City Mental Hospital, 1932–34. Proposed research: Metabolism of the central nervous system with reference to the effects of narcotic and basic amines in cases of mental isorder. At the Biochemical Laboratory, Cardiff City Iental Hospital.

The value of a fourth year Fellowship is £500 per annum, nd of a junior Fellowship £400 per annum.

In considering candidates for election this year the Trustees were influenced by a special desire to promote esearch in relationship to mental disease.

All correspondence of Fellows and candidates should be addressed to Prof. T. R. Elliott, M.D., F.R.S., Honorary Secretary, Beit Memorial Fellowships, University College Hospital Medical School, University-street, London W.C.1.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

DELINQUENCY AND DISCIPLINE

THE recent increase of juvenile crime in Rumania—cases of manslaughter and burglary committed by boys of secondary school age are reported—has prompted the Minister of Education to issue strict regulations regarding the control and upbringing of school-children. It has been made compulsory for them to wear uniforms, and they are also all to be numbered. Visits to cinemas have been prohibited, and they may only attend the theatre with the approval of their teacher. The Chamber of Deputies has passed a law making it compulsory for youths between the ages of 18 and 20 to take part in special military drills, which it is hoped will cultivate in them a love of order and discipline besides promoting their physical well-being. The drills will take place on Sundays and holidays, and may serve to occupy spare time which might otherwise be spent in unsuitable pastimes. Fifty drills will be held in the year, and manœuvres, lasting from 4–7 days, will take place in special camps. Badges will be awarded for proficiency, and records of attendance and progress will be kept. Parents of children who take part in the drills will be exempt from certain taxes, and two years' attendance will secure a six months' curtailment of the usual term of military service (20–36 months). Those who are not physically fit enough to attend the drills must produce a doctor's certificate, and those who absent themselves without permission will be punished by two days' hard labour for the benefit of the parish, and a fine of approximately 4*s.* which will be paid into the fund for the drills.

NEW HEALTH INSURANCE BILL

As the law stands at present any employee who is incapacitated either through illness or by an accident may claim sick benefit for six weeks no matter how many years he has been employed. A Bill has recently been put before the Chamber of Deputies which proposes that ten years' employment shall entitle the employee to eight weeks' benefit, and every further five years' employment to a further week's benefit. Thus after 30 years' employment 12 weeks' benefit may be claimed. The employee will also be entitled to a further two weeks' sick leave without pay during which time his position must not be filled and he cannot be given notice. After two years' employment maternity benefit is to be paid. An insured person who loses his employment will still be eligible for benefits for a quarter of the total period over which he has paid contributions, with a minimum of 24 months. According to present regulations the period is fixed at 30 months. The new system has been in force in Czechoslovakia for some time, where it is found to work well. Another suggested innovation is that contributors of ten years' standing, who lose their jobs at the age of 55, should, after 12 years' unemployment, automatically become eligible for the old-age pension, while for women the age limit is to be 54.

MOVEMENT AGAINST FOREIGN QUALIFICATIONS

The association of medical students of the University of Cluj, the capital of Transylvania, have presented a memorandum to M. Tatarescu, the premier, stating that graduates of the Rumanian universities find it difficult to obtain posts, as preference is given to doctors who go to study at Austrian, Hungarian, and Italian universities, where they receive degrees which are marked "valid for the Orient." The students appeal to the Government to give preference to graduates from Rumanian universities.

TUBERCULOSIS

The Minister of Health has introduced a Bill which outlines the organisation of a league against tuberculosis. The measures suggested include an energetic campaign against bad hygienic conditions which favour the spread of tuberculosis; the coordination of existing institutions; the organisation of antituberculous inoculation; propaganda and public education; the training of physicians and nurses; the establishment of dispensaries, isolation hospitals, sanatoriums, and so forth. All such institutions must be approved by the council of the league which controls all such institutions. The council of the league consists of six members who are elected for five years. The league receives the larger part of its income from the Ministry of Health, which in turn acquires it from duties on drugs, cosmetics, proprietary medicine, narcotics, State monopolies and lotteries, and the tax on alcohol. It is expected that the Bill will become law before the Chamber adjourns, and the league will thus be able to begin its work in August or September.

HOUSING CONDITIONS IN BUCHAREST

In reply to a question in the Chamber of Deputies, it was recently stated that in Bucharest there are 30,000 dwellings where 3–5 persons share one room, 13,500 where 6–10 persons share one room, and 1357 dwellings where more than ten persons live in one room. Ten per cent. of the population have a bed each, 36 per cent. sleep 2 in a bed, 27 per cent. 3 in a bed, 11 per cent. 4 in a bed, 3 per cent. 6 in a bed, and 2 per cent. 7–8 in a bed. In Rumania there are 40,500 underground dwellings and 661,400 one-roomed dwellings, most of which have windows pasted up with cardboard to keep the house warm in winter and cool in summer, and about 1,000,000 houses have floors of earth. The hygienic conditions are said to be good in only 4 of the 72 counties, in 21 they are satisfactory, while the rest are described as unsatisfactory. Owing to lack of accommodation it is possible to isolate only 20 per cent. of the patients suffering from infectious diseases. Though the law governing public health prescribes that every county should allot a certain sum from its budget for public health purposes, in the counties of Dolj, Mehedint, and Romanati not one penny is assigned to this work.

WESTMINSTER HOSPITAL.—Dr. Adolphe Abrahams has been elected dean of the medical school in succession to Sir Stanley Woodwark.

CORRESPONDENCE

THE STUDY OF CLIMATE

To the Editor of THE LANCET

SIR,—At the conference of the British Health Resorts Association two weeks ago pleas were put forward for a closer study of climate from a scientific aspect. The information which this society is collecting with regard to the special features and therapeutic value of the various spas and resorts will no doubt provide knowledge which should prove of practical value to doctors and the public. This is a step in the right direction, but it is not enough, for the information thus obtained can only be of a rather vague and general nature and unless fortified by scientific observation on the spot, whether it be spa or health resort, there can be but little hope of our being able to make detailed statements on the value of climate.

The rôle of climate in the study of disease has not to my mind been fully appreciated. It is often assumed that because people do not exhibit violent reactions to the sun, change of wind, change of humidity, &c., which sensitive subjects do, that no responsive changes are taking place via their skin and mucous membranes, which have an effect on their metabolism.

You suggested last year in a leading article on the More Exact Study of Climate (1933, ii., 546) that "human sensitiveness to physical surroundings especially in ill-health, surpass that of any instrument." If this fact were realised and accepted as true it would perhaps encourage our profession to take the real interest in the subject which it surely deserves. The human being, like the rest of the animal kingdom, is born with certain potentialities, some with strong vitality, some with weak, some with perfect mechanism, others with structural weakness, and all alike are subject from the moment of birth (and, of course, remotely before this "in utero") to the effect of environment—i.e., to food and atmospheric conditions.

Surely on ordinary reasoning climate and diet should take the first place in any scheme of research. Much attention has been given, and rightly, to the study of organisms and the gross morbid anatomy of disease, but so little encouragement has been given to investigating or teaching on the earlier important phases of disease when prevention may be possible. As educated doctors we cannot be content indefinitely with mere statements that some climates are relaxing and some bracing, some suit asthmatics, and others rheumatism; we want to try and establish why; and until the study of reactions of individuals to changes in climate as regards temperature, humidity, salt content, and ionisation of atmosphere, is attempted no answer will be forthcoming. Is it too much to hope that money will be forthcoming for clinical research on these essential problems?

Now is the opportunity for coördinating effort on the research side with the British Health Resorts Association. It should be possible, if the importance of this subject were once accepted by the profession at large, to make a start by establishing units, or teams, which include clinician, climatologist, and laboratory workers at one or two spas, and at, say, several sea coast resorts with divergent climatic conditions—e.g., Norfolk and Cornwall. Clinical material of the kind required is abundant—i.e., in convalescent homes

Such ideas have, I know, already been put forward, but they do not seem to be coming to fruition. I write, therefore, to urge the continued interest of your journal in this subject, and to help to press its claims as a subject worthy of accurate scientific observation in the relation to health and disease.

I am, Sir, yours faithfully,

Brook-street, W., July 12th. WILFRED J. PEARSON.

THE TREATMENT OF SCHISTOSOMIASIS AND ANKYLOSTOMIASIS WITH ACRIFLAVINE

To the Editor of THE LANCET

SIR,—Mr. Fisher's note on the treatment of schistosomiasis with acriflavine, which appeared in THE LANCET of April 28th, has made a noticeable move in the medical centres in Egypt. Egypt is one of the countries in which two types of schistosomiasis are common—i.e., *Schistosoma hæmatobium* and *Schistosoma mansoni*—the first being common in Upper Egypt, Cairo included, and the latter being more common in the Delta (Lower Egypt). The course of treatment suggested by Mr. Fisher is very simple, as it shortens the course to five days instead of one month under the tartar emetic treatment, and of three weeks under "Fouadin" treatment; it has the added advantage of doing away with intravenous and intramuscular injections.

Trials have been made by myself to test the effect of acriflavine on *Schistosoma hæmatobium* infection in Cairo.

Twelve cases were selected: 2 adult males, 6 boys, 1 adult female, and 3 girls. Of these cases 11 were infected with *Schistosoma hæmatobium* ova in the urine, and only one case, a girl of 11 years, had *Schistosoma mansoni* ova in the stools. The solution of Trypaflavine (acriflavine) was given according to Mr. Fisher's scale, and a dose of magnesium sulphate was given three hours after the trypaflavine.

After five doses given on five consecutive days, the examination of the excreta of the 12 cases showed the presence of abundant schistosoma ova with no alteration in the viability of the embryo. The hatching time of ova was done before and after treatment, under the same conditions, and showed no alteration. One cubic centimetre of the sediment of the urine was added to 60 c.cm. of fresh water at 50° C., and the hatching of ova observed. The hatching time after the five consecutive doses was made three days after the last dose. This was done purposely. If the hatching time test is done immediately after the last dose, while the trypaflavine is still being excreted in the urine, there will be the possibility that a long hatching time is due to the presence of trypaflavine in the urine and its effect on the ova in the bladder; simply as occurs when adding trypaflavine to an infected urine in a test-tube. Usually excretion of the stain in the urine and stools begins in about one hour after the first dose in children, and after about one and a half hours in adults, and is complete in about 48 hours after the last dose, except in children who receive a proportionally larger dose, where excretion is complete in a slightly longer time.

The only benefit of the treatment was symptomatic. The irritation in passing urine and the hæmaturia were markedly diminished. Five cases out of the 11 urinary cases were suffering much from symptoms of cystitis and hæmaturia, and all of them were relieved by the treatment, but the urine was still strongly positive for ova. My final conclusion as regards the trypaflavine treatment in urinary schistosomiasis is that it is useless as a curative agent but it ameliorates the symptoms of cystitis.

Six patients of the 12 mentioned before were ositive for ankylostoma ova in the stools. By a ood chance I noticed that repeated examination f the stools after the course of trypaflavine treatment did not show any ankylostoma ova in the stools xcept in one case in which it was positive after he fourth examination. This shows that trypalavine is effective in treating ankylostoma. Even he positive case mentioned was only positive after he fourth examination, showing that the number of ankylostomes in the intestine was much reduced. Other cases of ankylostoma infection were selected for trial. Up till nów 10 cases in all have been given the trypaflavine treatment; 6 were given 5 doses each on 5 consecutive days, and 5 out of these were negative after repeated examinations. Two were given 2 doses each in 2 consecutive days and their stools were persistently negative. One was given 1 dose and was found negative and 1 with a very heavy infection was given 4 doses on 4 consecutive days and was still positive. So this gives a rate of 2 failures in 10 cases; a very promising result. Upon other worms—e.g., ascaris, oxyuris, &c.—which happened to be present with ankylostoma the results were not satisfying. Now trials are being made to estimate the proper dose and number of doses necessary for treating ankylostoma.

This letter is only intended as a preliminary note, for further investigations upon the subject will be made.—I am, Sir, yours faithfully,

A. FAKHRY, M.B. Cairo,
P.M.O., Bilharzia and Ankylostoma Hospital
July 9th. (Shoubra), Cairo.

SPECIFIC SUPERSENSITIVENESS

To the Editor of THE LANCET

SIR,—Drs. Grant and Scott, in discussing the case of acute serum shock that they report in your columns last week, bring forward evidence that natural supersensitiveness is not specific. The same syndrome of collapse resembling anaphylactic shock—cough, sudden syncope, cyanosis, and feeble pulse—has been reported twice after intravenous injection of quinine-urethane for varicose veins,[1] [2] and both patients gave a positive skin reaction to quinine when subsequently tested. Many thousands of quinine injections must have been given up to date, but only these two cases of collapse have reached the literature. A much larger proportion of patients, however, are sensitive to quinine taken by mouth or applied topically. Bram, while developing his quinine-tolerance test for hyperthyroidism, found 4 patients out of 500 who developed erythemata.[3] Local dermatitis after the use of after-shave lotion containing quinine has been noted in about ½ per cent. of those indulging in this luxury.[4] And cases of urticaria and sneezing have been frequently reported after the use of quinine. These non-specific reactions lend support to Prof. Topley's claim[5] that drug idiosyncrasies are manifested by a symptom-complex, bearing no relation to the substance evoking it. It has been shown that many of the skin eruptions and the coryza following the exhibition of quinine can be avoided by using the dextro-rotatory isomers.[6] This is not the whole story, however, for a certain number of persons are sensitive in a different way to quinine; they do not react in the non-specific allergic manner, but develop the distinctive toxic picture of the drug—tinnitus, deafness, restriction of the field of vision, and labyrinthitis—with an unusually small dose.

Supersensitiveness, to drugs at any rate, must be classified into two groups: one, the non-specific allergic syndrome, including the rare cases of anaphylaxis which appear to follow parenteral therapy; the other, the "specific" syndrome, which manifests the specific selective action on the tissues characteristic of the drug in question.

I am, Sir, yours faithfully,
Bristol, July 13th. FRANK BODMAN.

THROAT AFFECTIONS AND THE O.T.C. CAMPS

To the Editor of THE LANCET

SIR,—On July 30th the various Officers' Training Corps will commence a ten days' camp round Aldershot. In view of the numerous septic throats which have been prevalent during the droughts of the recent winter and the present summer, would it not be a wise precaution if the authorities arranged for a morning and evening "gargle" parade? This could be very easily done, especially by means of perborate of soda which is a most efficacious and harmless agent. All those who have served in camps in the neighbourhood of Aldershot know well the irritating and infective dust encountered there.

I am, Sir, yours faithfully,
Harley-street, W., July 14th. MACLEOD YEARSLEY.

URTICARIA FROM BEE-STINGS AND FISH-POISONING

To the Editor of THE LANCET

SIR,—Two sisters who kept bees, instead of acquiring immunity to the poison, became highly sensitised. The younger, aged 27, first had charge of the bees and was often stung, but only slight local irritation ensued, which soon passed off. Then towards the end of the second season she had two violent attacks following bee-stings. About 15 minutes after being stung intense urticaria started all over the body, including head and limbs, accompanied by a feeling of serious illness, fainting, and collapse. A doctor was called on the second occasion, and on his advice she kept away from the bees.

The elder sister then took charge and, apart from trivial local irritation, bee-stings had no unpleasant effect during the first two years. About mid-season of 1932 a very serious attack occurred, said to be due either to food-poisoning or to a bee-sting, or to both combined. The bees were avoided for the rest of that year and during 1933. She took charge of them again in April, 1934, and had one sting on a leg, about mid-May, with only slight local effect.

Three bee-stings on May 30th (two on left hand and one on left leg) were followed within 20 minutes by intense urticaria from head to foot. Irritation began on the scalp and spread rapidly, accompanied by a "terrible cough," and much cardiac and mental distress. She took two tablets of calcium sodium lactate powdered in water when the irritation began. But as the general condition continued to get worse, 1 oz. of Phillip's milk of magnesia was given in some water. Very marked relief of the intolerable itching, and of the cough, cardiac, and mental distress began within five minutes after taking the magnesia. She was quite comfortable two hours later and slept well. There was slight œdema of the dorsum of the little change in the number found in the streets, on staircases, and under arches.

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[1] Cruickshank, A. G.: Brit. Med. Jour., 1929, i., 104.
[2] Gray, St. G. B. D.: Ibid., 1929, i., 200.
[3] Bram, I.: Arch. Internal Med., 1928, xlii., 53.
[4] Burgess, J. F.; and Usher, B.: Canad. Med. Assoc. Jour., 1930, xxiii., 45.
[5] Topley, W. W. C.: Outline of Immunity, London, 1933.
[6] Fletcher, W., and Travers, E. A. O.: Brit. Med. Jour., 1923, i., 629.

It is noteworthy also that the number using voluntary societies' homes and shelters is on the increase. Such homes include the Cecil Houses for women established in various parts of London through the efforts of Mrs. Cecil Chesterton, and in view of the reasons which led to this undertaking (see THE LANCET, 1927, i., 659) we are glad to learn that the Council's public assistance committee proposes to give detailed consideration to certain aspects of the present census in its relation to the general question of the homeless poor. The problem is a difficult one, as was obvious from the report on common lodging-houses issued by the medical officer of health in 1927, and reviewed in our columns (loc. cit.). But in spite of comparatively reassuring figures those familiar with the neighbourhood of the Embankment during the past winter will find difficulty in believing that it has yet been adequately solved.

The Census

H.M. Stationery Office have now issued, at 30s., a volume containing the occupations statistics derived from the 1931 census of England and Wales. Besides figures for the country as a whole, data are furnished for 12 geographical regions into which the country has been divided, and also for counties and large urban areas. The system of classification of occupations used for the 1921 census has been substantially retained, and is described in detail, with an alphabetical index of about 35,000 occupational terms, in a separate volume entitled "Classification of Occupations" (12s.).

An innovation has been introduced by the inclusion of census statistics of persons out of work at the date of the census. The classifications of such persons embrace all classes of the community, including those outside as well as those within the scope of the various insurance schemes. In the present volume the reader will find comparative material by means of which the larger features in the occupational changes which took place between 1921 and 1931 may be studied. The general character of these changes, with their drift away from agriculture and heavy industries, is, of course, already well known.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 7TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 1 (last week 1); scarlet fever, 2245; diphtheria, 1114; enteric fever, 35; acute pneumonia (primary or influenzal), 601; puerperal fever, 43; puerperal pyrexia, 123; cerebro-spinal fever, 15; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 8; dysentery, 7; and ophthalmia neonatorum, 88. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 16th–17th was as follows: Small-pox, 0 under treatment, 0 under observation (last week 1 and 0 respectively); scarlet fever, 1586; diphtheria, 1514; measles, 1061 (last week, 1221); whooping-cough, 300; puerperal fever, 27 mothers (plus 9 babies); encephalitis lethargica, 269; poliomyelitis, 2; "other diseases," 215. At St. Margaret's Hospital there were 15 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there were no deaths from small-pox, 1 (0) from enteric fever, 17 (3) from measles, 4 (0) from scarlet fever, 21 (5) from whooping-cough, 32 (11) from diphtheria, 35 (6) from diarrhœa and enteritis under two years, and 15 (1) from influenza. The figures in parentheses are those for London itself.

Of the deaths from measles 3 were in Tynemouth and 2 in Liverpool. Whooping-cough caused 3 deaths in Birmingham and 2 in Manchester. Four fatal cases of diarrhœa and ent were reported from Birmingham, 3 in Manchester, and 2 in Bradford, Newcastle-upon-Tyne, Salford, and Wolverham

The number of stillbirths notified during the we was 251 (corresponding to a rate of 37 per 1000 to births), including 42 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THERE will be ten vacancies for medical officers i September next. Candidates must be less than 28 yea of age, and the term of service will in the first place b three years. Further particulars are given in our adve tisement columns.

S. G. French to be Surg. Lt. (Short Service).

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. (D) J. E. Daniels to be Surg. Lt.-Comdr. (D).

Surg. Sub-Lt. H. R. Vickers to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS

H. V. D'A. Iles to be Lt. (on prob.), and is secd.

RESERVE OF OFFICERS

Lt.-Col. A. J. Williamson, having attained the ag limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY

Lt.-Col. H. F. Wilkin (ret. T.A.) to be Lt.-Col.

H. B. Lee (late Offr. Cadet Serjt., Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

H. S. H. Gilmer to be Lt.

INDIAN MEDICAL SERVICE

Lt.-Col. A. A. McNeight to be Col.

Lts. to be Capts.: W. A. N. Marrow, H. B. Macevoy, M. M. Mansfield, J. Guthrie, W. J. Stewart, J. D. Grant, W. H. G. Reed, T. E. Palmer, D. G. McCaully, F. C. Jackson, J. W. Bowden, J. M. Sclater, J. D. Murdoch, C. F. Garfit, D. K. L. Lindsay, D. R. Tweedie, A. T. Andreasen, W. S. Morgan, M. S. Purvis, M. E. Kirwan, R. D. MacRae, C. J. H. Brink, W. Mackie, G. S. N. Hughes, J. W. Richmond, A. D. Barber.

Lts. (on prob.) to be Capts. (on prob.): M. Ata-Ullah, G. B. Thomas, J. White, H. A. Ledgard, T. F. O'Donnell, W. W. Laughland, S. Ahmad, C. C. Kapila, F. W. Allinson, F. R. Cawthorne, W. B. Stiver, F. V. Stonham, J. M. Mathew, J. G. Stonham, L. Feinhols, G. F. Harris, F. W. Whiteman, F. C. Leach, and R. D. Scriven.

ARMY IN INDIA RESERVE OF OFFICERS

Capt. M. L. Gujral relinquishes his commn., on appt. to the I.M.S.

ROYAL AIR FORCE

Flight Lt. J. MacC. Kilpatrick is promoted to the rank of Squadron Leader.

Flight Lt. D. Loughlin is transferred to the Reserve, class D.

Dental Branch.—Flying Offr. D. I. Malcomson is promoted to the rank of Flight Lt.

SPECIAL RESERVE

Flying Offr. R. H. Vartan is promoted to the rank of Flight Lt.

DEATHS IN THE SERVICES

The death is reported of Surg.-Lieut. (D) J. W. Robinson, R.N., one of a party of officers from H.M.S. *Devonshire* who, while sailing opposite the island of Samos on July 14th, were fired upon by Turkish sentries. Surg.-Lieut. Robinson was hit and lost overboard.

Lt.-Colonel Jeremiah Penny, I.M.S., retired, who died on July 7th during a voyage home from India, aged 70, qualified with the double English diplomas in 1887, having studied medicine at King's College Hospital, where he afterwards held several junior appointments. He was also House Surgeon at St. Peter's Hospital for Stone. In 1891 he received his first commission in the Indian Medical Service, and was in Burma in 1892–93—Chin Hills (medal and clasp). He reached the rank of Lt.-Col. in 1911.

OBITUARY

ILLIAM WILFRID KING, M.B., Ch.B. Bristol, F.R.C.S. Edin., F.C.O.G.

THE death occurred on July 9th of Mr. W. W. King, prominent gynæcological surgeon in Sheffield, ho had played a great part in the hospital developents of the city during the past 20 years. He was his 52nd year.

King was educated at Stonyhurst, received his rofessional training in the medical school of Bristol niversity, took the English double diploma in 906, and obtained the F.R.C.S. Edin. in 1908. wo years later he graduated as M.B., Ch.B., at ristol. He was for a time house surgeon at the oyal Hospital, Sheffield; he then became resident bstetric officer at the Royal Infirmary, Bristol, ut continued his association with Sheffield by becomng house surgeon and, later, registrar to the Jessop Hospital for Women; he was then duly appointed surgeon to the hospital and lecturer in gynæcology and obstetrics in Sheffield University.

King, prepared by long residence at a special women's hospital, seized the opportunity to increase his knowledge in general pathology by taking the post of clinical pathologist at the Royal Infirmary, Sheffield, which he occupied from 1911 to 1920. He was soon recognised among his colleagues and the public for his sound gynæcological work. He became an acknowledged expert in his specialty, not only locally but over a wide area, and was an exceptionally successful operator. His special interest was the investigation of the causes, near and remote, of puerperal fever. He wrote on this subject and on pelvic adenomyomata in the *British Medical Journal*, and contributed other papers to the *Journal of Obstetrics and Gynæcology*, and to the transactions of the North of England Obstetrical and Gynæcological Society, in the service of which body he served as secretary and president. The transactions of that society from 1912 onwards contain many records of his valuable papers and communications, and of the remarks, variably apposite and illuminating, with which he reinforced the society's discussions. Widely read, keenly observant and alert, with a very large clinical experience and deep interest in its pathological aspect, he was always prepared to discuss usefully any question involving his specialty. The paper on the clinical symptoms of pelvic adenomyoma was read at the annual meeting of the British Medical Association at Bradford in 1924, and has been often drawn upon by other writers on that subject. Many authorities also consider his observations and views on the difficult subject of puerperal sepsis to be of the greatest importance. For the past seven years he had controlled 30 lying-in beds at the Nether Edge Municipal Maternity Hospital, thus adding to his experience and responsibilities. He was an examiner in his subjects at Sheffield University and the Central Midwives Board, and had been elected F.C.O.G. for his valuable work in connexion with the foundation of the new College.

King had an extremely critical sense and accepted nothing unless he could convince himself that it was right and logically sound. This attitude of mind rendered him most valuable as a colleague, and though he was often in disagreement, yet, on the other hand, he was always ready, if necessary, to acknowledge he was wrong, and when once convinced gave his whole-hearted support to further the project under consideration. By a tragic coincidence, it was during the investigation of an outbreak of puerperal sepsis that he developed a streptococcal infection of the throat, from which arose the septicæmia which, after several weeks' illness, caused his death.

King was a member of a well-known West Country Catholic family, was deeply religious, and the Catholic community of Sheffield have lost one whom it will be difficult to replace. This was apparent from the large congregation which attended the Requiem Mass held at St. Marie's Church, Sheffield, and was present later at the interment. The medical and lay community of Sheffield have lost a valued member and the medical students an inspiring and forceful teacher. His loss will be especially felt by the board, staff, and patients of the Jessop Hospital, for which institution he had done so much faithful service.

FRANCIS EDWARD FORWARD, O.B.E., F.R.C.S. Eng.

THE death of Mr. Francis Edward Forward, which occurred on July 2nd at 12, West Park, Mottingham, London, S.E. 9, followed on an illness of over 18 months. Born in 1866 at Chard, Somerset, he received his general education at Sherborne and proceeded for medical training to St. Thomas's Hospital. He qualified with the English double diploma in 1889 and took the F.R.C.S. Eng. in the following year. He now joined the Colonial Medical Service as medical officer of the Holberton Hospital, Antigua, West Indies, a post which he held from 1891 for the following eight years, and was made a member of the Legislative Council of the Leeward Islands, of which Antigua is the seat of government. In 1899 he transferred to the Home Office Department and held various appointments in the Office until he retired in 1930, when he received the distinction of O.B.E. Mr. Forward leaves a widow and one son.

NEWMAN NEILD, M.B., Ch.B. Vict., F.R.C.P. Lond.

SENIOR PHYSICIAN, GENERAL HOSPITAL, BRISTOL

WE regret to announce the death of Dr. Newman Neild, senior physician to the Bristol General Hospital, which occurred suddenly on July 4th at his house, Richmond Hill, Clifton, Bristol.

Newman Neild, a Manchester man, was the son of the Principal of Dalton Hill, was educated at Bootham School, and pursued his medical curriculum at Victoria University, Manchester. He qualified in 1897 with the double English diploma and became house physician to the Royal Infirmary, Manchester; he then, in London, filled the important junior posts of house physician to the Brompton Hospital for Consumption and to Great Ormond-street Children's Hospital. He now settled in Bristol, and was appointed in 1901 assistant physician to the General Hospital, and in this capacity gained a sound reputation through his prolonged work in the X ray department, where he worked for 17 years with assiduity. He communicated to THE LANCET in 1909, in association with Dr. E. V. Dunkley, an interesting paper on the rôle of saliva in the transmission of tubercle, and their observations, which were considerably quoted 25 years ago, helped to make public authorities recognise the dangers of the then prevalent and nasty habit of expectoration in public vehicles. On promotion to full physician Neild took the diploma of M.R.C.P. Lond., and in 1928 was elected F.R.C.P. At the Bristol Medical School Neild lectured for a long period in pharmacology and therapeutics, in which subjects he was recently an examiner for the diploma of the English Conjoint Board. He was an able draughtsman, and in conversation would often pull out paper and pencil and illustrate his views on the points under discussion. He was interested in old books, especially those relating to botany. He held many important posts in connexion with the British Medical Association, and enjoyed well-merited esteem for much all-round work, public and professional.

DAVID ROSS, M.D. Aberd.

Dr. David Ross, who died at his house in Kingsland-road, London, on July 4th, received his early education in Aberdeen, studied medicine in the University of the City, and also at St. Bartholomew's Hospital, London, and graduated M.B., C.M. Aberd. in 1894. In 1898 he obtained the M.D. Aberd. with highest honours, and shortly afterwards settled down to practice in the north of London, where he enjoyed a wide reputation for efficiency and public spirit. He did valuable service for many years for the British Medical Association, being at different times a member of the Representative Body and of the Council. He was for a time honorary medical officer to the Metropolitan Hospital, he served as President of the Hunterian Society, and was vice-chairman of the National Service Medical Board of the City of London. He was also for a period examiner in materia medica at the University of Aberdeen. Dr. David Ross was a very able man, well read and considerably travelled, and his death has been felt as a loss by a large circle.

CHARLES JOSEPH HEATH, F.R.C.S. Eng.

The death occurred on July 13th at his house in York-terrace, Regent's Park, London, of Mr. C. J. Heath, who was principally known in connexion with methods devised for the remedy of chronic suppuration of the ear, and the restoration of hearing.

Charles Joseph Heath was born in 1856, and educated at Totnes Grammar School, proceeding for his medical training to St. Bartholomew's Hospital. He was a successful student from the beginning, winning the Treasurer's Prize in practical anatomy for first year students, and the Foster Prize awarded for similar proficiency to more advanced pupils ; the result was an appointment as prosector at the Royal College of Surgeons of England. He took the diploma of M.R.C.S. in 1884, and the final Fellowship in 1886. He was then, for a period, house surgeon at the Preston Royal Infirmary, but continued his interest in structural anatomy, and decided to specialise in otology, as providing an outlet for his skill in dissection. He returned to London, and was appointed assistant surgeon to the Central London Throat, Nose and Ear Hospital, and later surgeon to the Golden-square Throat, Nose and Ear Hospital, his services being also requisitioned by the Metropolitan Asylums Board.

The procedures which he devised for the cure of chronic suppuration of the middle ear, without removal of the drum or ossicles, were described in a paper read before the Otological Society in 1904. Accompanying the reading of this paper he showed several patients who had been operated upon by his modification of the radical mastoid operation. This paper was itself a sequel to one read before a local medical society previously in which he had endeavoured to demonstrate the good results of his operative measures. In the interval he had performed his operation a hundred times with such a measure of success that he was, he said, convinced that it, possibly with slight modifications, would ultimately be adopted as a means of restoring hearing to a large number of persons afflicted with suppurative disease. But although his views led to close discussion he made few disciples among the leaders of his specialty. In 1907 he described in our columns ten cases where the cure of chronic suppuration of the middle ear had followed the employment of his methods, neither the drum nor ossicles having been removed, and the hearing remaining good. He continued to report on the favourable results of further series of patients, and at a debate before the British Laryngological, Rhinological and Otological Association in the same year he met with more support than he had previously experienced, though words of caution were uttered with regard to the dangers that his variation in the radical mastoid operation might bring about. He had a large practice as an aural surgeon, and spoke at congresses and wrote in the transactions of societies and elsewhere, with conviction, on his subject. During the war he was attached as aural surgeon to one of the military hospitals, and his mechanical aptitude was here displayed in modifications of the gas helmet, while he also put forward an altered design for army boots.

Heath was a keen sportsman, and a member of the Wild Birds Advisory Committee of the Home Office. He was devoted to both fishing and shooting, and in connexion with the latter sport it is characteristic of him that he invented a wild-fowling gun. He was a widower, his wife, who died in 1930, being the daughter of Colonel J. J. Wilson, he is survived by two daughters.

ALEXANDER THEODORE BRAND, M.D.

The death of Dr. Alexander Theodore Brand at the advanced age of 81, which took place at Great Driffield, Yorks, will be deeply regretted by a large circle of patients and personal friends. To one of these we owe the following biographical note.

"For some years Alexander Brand was engaged in business in Aberdeen, but he always had a great desire to study medicine, and in 1877 he began his course at the University of Aberdeen, being a good many years older than his fellow students, and the writer of these lines, who began his curriculum in the following session, admired at the time, and has ever since from a fuller experience of life continued to admire, the good fellowship and understanding which always existed between him and his juniors. This was a state of affairs which was to the credit not only of Brand but of the youngsters who worked alongside of him. He qualified as M.B., C.M. in 1881 and proceeded to the degree of M.D. in 1884. Some time was spent in the London and Vienna schools and then he became associated with the late Dr. Eames in his practice at Great Driffield, and when Dr. Eames left the district he carried on the practice for some time alone and later in association with his relative Dr. J. R. Keith. He was not a frequent writer, but he made certain communications in support of the infective nature of cancer on which he held strong views.

When Brand was in business in Aberdeen he was a keen volunteer and held commissioned rank in the 1st Volunteer Battalion of the Gordon Highlanders. Later he became Major in the R.A.M.C. and was O.C. 2nd Field Ambulance East Yorks Volunteers, and retired with the rank of surgeon major (V.D.). He was much interested in the work of the St. John Ambulance Association and he was an officer in the Order of St. John. For many years he was the medical officer of the Driffield and District Poor-law Infirmary. He was a man of fine presence, great charm of manner, courteous, kind, and absolutely straightforward in his dealings."

SIR JAMES KINGSTON FOWLER.—The accidental mutilation of a sentence in the obituary notice which appeared last week of Sir James Kingston Fowler must be corrected. The notice states that *not many of his colleagues on the Beit Foundation* knew him personally; the exact reverse was the case, and the sentence should have run "not many of the other Fellows knew him personally." We much regret the error.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Milk Bill and the Tuberculin Test

IN the House of Lords on Thursday, July 12th, Earl DE LA WARR, Parliamentary Secretary to the Ministry of Agriculture, moved the second reading of the Milk Bill which has already passed through the House of Commons. He said that the Government could feel that in this Bill they were putting before their Lordships a really balanced policy for the milk industry. It could be divided into three parts. The first was an attempt to save the industry and stave off ruin by putting a bottom into the market. That scheme would cost something over £1,500,000 per annum. That payment would operate over a period of two years, and after that period if prices had risen to a certain height these payments would have to be repaid to the Exchequer. The second and third parts of the policy constituted an attempt to increase the production of milk in this country. The first method of doing that was by cleaning up the herds from the fell disease of tuberculosis, which was, unfortunately, too common among cows, and the second method was a scheme of milk publicity, of spending £500,000 a year for the next two years very largely on increasing the supply of milk in schools for school-children.

Lord MARLEY said that Earl De La Warr had said that they must improve the quality of milk and increase the consumption and he proposed to spend public money in doing those two things simultaneously. Was he going to use public money to advertise immediately by an increased consumption of rotten milk which was now being distributed or was he going to wait until the milk was really good before he advertised by an increase in the consumption by school-children? The noble lord should have said that the quality of milk in this country was probably less good than in any modern civilised country. According to the Report of the Committee on Cattle Diseases, at least 40 per cent. of the cows in dairy herds in this country were infected with tuberculosis. Was the Government going to try to bring about an increase in the consumption of liquid milk by the children of the workers of this country when he knew that the effect must mean an increase in the percentage of the distribution of milk which was not free from tuberculosis? He thought that some of the measures proposed for cleaning up the herds were good and he welcomed the change in the grading of milk. The proposal to pay premiums for pure milk was also a very good preliminary measure. He knew that a system of this kind had resulted in an enormous reduction in the number of bacilli per cubic centimetre and an improvement in the fat content. He was not unaware of the immense value of the drinking of raw liquid milk, and even of skimmed milk, by school-children. These were good things, but the milk must be pure. He regarded this Bill as a trick measure which he did not believe would do what the nation wanted. There was no sign that it would be T.T. milk that would be supplied to school-children. The only way that they would get a move on in getting pure milk in adequate quantities for the nation was by preventing the sale of non-tested milk by retailers.

Lord CRANWORTH said that from time to time the medical profession had urged the necessity for cleaning up the milk-supply. He would be happier if, when they criticised the uncleanly methods of British farmers, they also turned attention occasionally to the people overseas as well. An analysis of the skimmed sweetened and unsweetened milk imported from abroad had shown that practically the whole value of that compound lay in the sugar. For hundreds of thousands of children in the poorer classes that was the only form of milk which they got. In all probability the harm done to those children by drinking that condensed sweetened milk was far greater than if they drank the dirtiest milk produced on any British farm. Probably 80 per cent. of the cows that were reactors could be discovered by careful and regular clinical examinations. In a year or two those reactors and dangerous cows would become fewer and fewer until in all probability they became almost non-existent. The scheme now proposed for accredited herds was an eminently desirable one, for the herds to be accredited would have to pass through a minimum number of clinical examinations a year, but it was still more important that all herds should be subject to periodical clinical examination. There was also the question of the reliability of the test. Anyone who had herds would know how desperately unreliable these tests were at present. If they were going to increase very largely the veterinary staff it was hardly likely that the standard of veterinary skill would increase in the way necessary to make the test as reliable as it should be. In the case of bovine tuberculosis science had made as great strides as in other branches of medicine. A book had just been published called "Spahlinger *contra* Tuberculosis." It contained a host of reliable names giving evidence, lay, medical, and veterinary. It described Spahlinger's experiments in Switzerland and in Norfolk which were successful. Finally, the Government of Northern Ireland were so impressed by these tests that they decided to hold a Government inquiry. On December 17th, 1932, they published a report of an official demonstration made in Belfast which showed that 100 per cent. of the calves immunised by Spahlinger's vaccine had triumphantly resisted an infection of tuberculosis which proved fatal to non-vaccinated calves in a few weeks. To the medical man there might very well be reasons which proved that all that was stated in this book was not true, but it was full of names of the very highest repute, and if one-quarter of what was said was true this was a thing that ought not to be lightly set aside.

Viscount ASTOR said that it was obvious that a certain amount of milk was unsatisfactory and even dangerous, but it was very easy to emphasise the danger to children by over-emphasising that particular point. It was probable that of the cows which reacted to the tuberculin test only 22 per cent. gave tuberculous milk, and that of the whole tuberculous population only 5 per cent. suffered from bovine tuberculosis. The deaths from non-pulmonary tuberculosis, and on the whole that was the infantile death-rate, in 1911 was 14,600. Last year the deaths had dropped to 5400, or about one-third of what they had been. That indicated a very decided improvement in the quality of the milk available for children. If they were to make a herd tubercle-free it was absolutely vital that they should have a reliable test, otherwise they got reinfection in the herds. Unless they had skilled veterinary surgeons of experience to carry out this very difficult work they would not get similar results. In regard to which subjects he was recently an examiner for the diploma of the English Conjoint Board. He was an able draughtsman, and in conversation would often pull out paper and pencil and illustrate his views on the points under discussion. He was interested in old books, especially those relating to botany. He held many important posts in connexion with the British Medical Association, and enjoyed well-merited esteem for much all-round work, public and professional.

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The death occurred on July 13th at his house in York-terrace, Regent's Park, London, of Mr. C. J. Heath, who was principally known in connexion with methods devised for the remedy of chronic suppuration of the ear, and the restoration of hearing.

Charles Joseph Heath was born in 1856, and educated at Totnes Grammar School, proceeding for his medical training to St. Bartholomew's Hospital. He was a successful student from the beginning, winning the Treasurer's Prize in practical anatomy for first year students, and the Foster Prize awarded for similar proficiency to more advanced pupils; the result was an appointment as prosector at the Royal College of Surgeons of England. He took the diploma of M.R.C.S. in 1884, and the final Fellowship in 1886. He was then, for a period, house surgeon at the Preston Royal Infirmary, but continued his interest in structural anatomy, and decided to specialise in otology, as providing an outlet for his skill in dissection. He returned to London, and was appointed assistant surgeon to the Central London Throat, Nose and Ear Hospital, and later surgeon to the Golden-square Throat, Nose and Ear Hospital, his services being also requisitioned by the Metropolitan Asylums Board.

The procedures which he devised for the cure of chronic suppuration of the middle ear, without removal of the drum or ossicles, were described in a paper read before the Otological Society in 1904. Accompanying the reading of this paper he showed several patients who had been operated upon by his modification of the radical mastoid operation. This paper was itself a sequel to one read before a local medical society previously in which he had endeavoured to demonstrate the good results of his operative measures. In the interval he had performed his operation a hundred times with such a measure of success that he was, he said, convinced that it, possibly with slight modifications, would ultimately be adopted as a means of restoring hearing to a large number of persons afflicted with suppurative disease. But although his views led to close discussion he made few disciples among the leaders of his specialty. In 1907 he described in our columns ten cases where the cure of chronic suppuration of the middle ear had followed the employment of his methods, neither the drum nor ossicles having been removed, and the hearing remaining good. He continued to report on the favourable results of further series of patients, and at a debate before the British Laryngological, Rhinological and Otological Association in the same year he met with more support than he had previously experienced, though words of caution were uttered with regard to the dangers that his variation in the radical mastoid operation might bring about. He had a large practice as an aural surgeon, and spoke at congresses and wrote in the transactions of societies and elsewhere, with conviction, on his subject. During the war he was attached as aural surgeon to one of the military hospitals, and his mechanical aptitude was here displayed in modifications of the gas helmet, while he also put forward an altered design for army boots.

Heath was a keen sportsman, and a member of the Wild Birds Advisory Committee of the Home Office. He was devoted to both fishing and shooting, and in connexion with the latter sport it is characteristic of him that he invented a wild-fowling gun. He was a widower, his wife, who died in 1930, being the daughter of Colonel J. J. Wilson, he is survived by two daughters.

ALEXANDER THEODORE BRAND, M.D.

The death of Dr. Alexander Theodore Brand at the advanced age of 81, which took place at Great Driffield, Yorks, will be deeply regretted by a large circle of patients and personal friends. To one of these we owe the following biographical note.

"For some years Alexander Brand was engaged in business in Aberdeen, but he always had a great desire to study medicine, and in 1877 he began his course at the University of Aberdeen, being a good many years older than his fellow students, and the writer of these lines, who began his curriculum in the following session, admired at the time, and has ever since from a fuller experience of life continued to admire, the good fellowship and understanding which always existed between him and his juniors. This was a state of affairs which was to the credit not only of Brand but of the youngsters who worked alongside of him. He qualified as M.B., C.M. in 1881 and proceeded to the degree of M.D. in 1884. Some time was spent in the London and Vienna schools and then he became associated with the late Dr. Eames in his practice at Great Driffield, and when Dr. Eames left the district he carried on the practice for some time alone and later in association with his relative Dr. J. R. Keith. He was not a frequent writer, but he made certain communications in support of the infective nature of cancer on which he held strong views.

When Brand was in business in Aberdeen he was a keen volunteer and held commissioned rank in the 1st Volunteer Battalion of the Gordon Highlanders. Later he became Major in the R.A.M.C. and was O.C. 2nd Field Ambulance East Yorks Volunteers, and retired with the rank of surgeon major (V.D.). He was much interested in the work of the St. John Ambulance Association and he was an officer in the Order of St. John. For many years he was the dical officer of the Driffield and District Poor-law irmary. He was a man of fine presence, great charm manner, courteous, kind, and absolutely straight- ward in his dealings."

SIR JAMES KINGSTON FOWLER.—The accidental utilation of a sentence in the obituary notice which appeared last week of Sir James Kingston Fowler must be corrected. The notice states that not many of his colleagues on the Beit Foundation knew him personally; the exact reverse was the case, and the sentence should have run "not many of the other Fellows knew him personally." We much regret the error.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Milk Bill and the Tuberculin Test

IN the House of Lords on Thursday, July 12th, Earl DE LA WARR, Parliamentary Secretary to the Ministry of Agriculture, moved the second reading of the Milk Bill which has already passed through the House of Commons. He said that the Government would feel that in this Bill they were putting before their Lordships a really balanced policy for the milk industry. It could be divided into three parts. The first was an attempt to save the industry and stave off ruin by putting a bottom into the market. That scheme would cost something over £1,500,000 per annum. That payment would operate over a period of two years, and after that period if prices had risen to a certain height these payments would have to be repaid to the Exchequer. The second and third parts of the policy constituted an attempt to increase the production of milk in this country. The first method of doing that was by cleaning up the herds from the fell disease of tuberculosis, which was, unfortunately, too common among cows, and the second method was a scheme of milk publicity, of spending £500,000 a year for the next two years very largely on increasing the supply of milk in schools for school-children.

Lord MARLEY said that Earl De La Warr had said that they must improve the quality of milk and increase the consumption and he proposed to spend public money in doing those two things simultaneously. Was he going to use public money to advertise immediately by an increased consumption of rotten milk which was now being distributed or was he going to wait until the milk was really good before he advertised by an increase in the consumption by school-children? The noble lord should have said that the quality of milk in this country was probably less good than in any modern civilised country. According to the Report of the Committee on Cattle Diseases, at least 40 per cent. of the cows in dairy herds in this country were infected with tuberculosis. Was the Government going to try to bring about an increase in the consumption of liquid milk by the children of the workers of this country when he knew that the effect must mean an increase in the percentage of the distribution of milk which was not free from tuberculosis? He thought that some of the measures proposed for cleaning up the herds were good and he welcomed the change in the grading of milk. The proposal to pay premiums for pure milk was also a very good preliminary measure. He knew that a system of this kind had resulted in an enormous reduction in the number of bacilli per cubic centimetre and an improvement in the fat content. He was not unaware of the immense value of the drinking of raw liquid milk, and even of skimmed milk, by school-children. These were good things, but the milk must be pure. He regarded this Bill as a trick measure which he did not believe would do what the nation wanted. There was no sign that it would be T.T. milk that would be supplied to school-children. The only way that they would get a move on in getting pure milk in adequate quantities for the nation was by preventing the sale of non-tested milk by retailers.

Lord CRANWORTH said that from time to time the medical profession had urged the necessity for cleaning up the milk-supply. He would be happier if, when they criticised the uncleanly methods of British farmers, they also turned attention occasionally to the people overseas as well. An analysis of the skimmed sweetened and unsweetened milk imported from abroad had shown that practically the whole value of that compound lay in the sugar. For hundreds of thousands of children in the poorer classes that was the only form of milk which they got. In all probability the harm done to those children by drinking that condensed sweetened milk was far greater than if they drank the dirtiest milk produced on any British farm. Probably 80 per cent. of the cows that were reactors could be discovered by careful and regular clinical examinations. In a year or two those reactors and dangerous cows would become fewer and fewer until in all probability they became almost non-existent. The scheme now proposed for accredited herds was an eminently desirable one, for the herds to be accredited would have to pass through a minimum number of clinical examinations a year, but it was still more important that all herds should be subject to periodical clinical examination. There was also the question of the reliability of the test. Anyone who had herds would know how desperately unreliable these tests were at present. If they were going to increase very largely the veterinary staff it was hardly likely that the standard of veterinary skill would increase in the way necessary to make the test as reliable as it should be. In the case of bovine tuberculosis science had made as great strides as in other branches of medicine. A book had just been published called "Spahlinger *contra* Tuberculosis." It contained a host of reliable names giving evidence, lay, medical, and veterinary. It described Spahlinger's experiments in Switzerland and in Norfolk which were successful. Finally, the Government of Northern Ireland were so impressed by these tests that they decided to hold a Government inquiry. On December 17th, 1932, they published a report of an official demonstration made in Belfast which showed that 100 per cent. of the calves immunised by Spahlinger's vaccine had triumphantly resisted an infection of tuberculosis which proved fatal to non-vaccinated calves in a few weeks. To the medical man there might very well be reasons which proved that all that was stated in this book was not true, but it was full of names of the very highest repute, and if one-quarter of what was said was true this was a thing that ought not to be lightly set aside.

Viscount ASTOR said that it was obvious that a certain amount of milk was unsatisfactory and even dangerous, but it was very easy to emphasise the danger to children by over-emphasising that particular point. It was probable that of the cows which reacted to the tuberculin test only 22 per cent. gave tuberculous milk, and that of the whole tuberculous population only 5 per cent. suffered from bovine tuberculosis. The deaths from non-pulmonary tuberculosis, and on the whole that was the infantile death-rate, in 1911 was 14,600. Last year the deaths had dropped to 5400, or about one-third of what they had been. That indicated a very decided improvement in the quality of the milk available for children. If they were to make a herd tubercle-free it was absolutely vital that they should have a reliable test, otherwise they got reinfection in the herds. Unless they had skilled veterinary surgeons of experience to carry out this very difficult work they would not get similar results. In regard to the tuberculin used, it was necessary that its potency or strength should be adequate, and that the strength of all tuberculin used for the test should be the same. The Tuberculin Committee of the Medical Research Council had emphasised in a memorandum the importance of satisfactory tuberculin. He suggested that either the Government should standardise tuberculin, or if that was impossible owing to administrative difficulties, then the Government should restrict the use of tuberculin for licensed herds to specified brands of known and adequate potency. If they did that he was certain that the process of cleaning up the herds would be accelerated and they would induce more farmers to test their herds and produce greater confidence among the public. He also urged that there should be more frequent testing than twice a year.

After further debate,

Earl DE LA WARR said that for the purpose of the final test of herds only standardised tuberculin would be used. Further it was hoped that in future when legislation made possible the control of certain therapeutic substances, that tuberculin would be one of the first substances to be dealt with. With regard to the scheme for milk in schools, such milk would be approved by the medical officer of health, and where the medical officer of health was not the same man as the school medical officer then it would also have to be approved by the school medical officer. He was quite sure therefore that Lord Marley would regret having thrown such an unfounded charge at the head of the Government as that they were going to force dirty milk into the schools.

Lord MARLEY said that he was very glad that that would not be the case.

The Bill was read a second time.

Poor Law (Scotland) Bill

The Poor Law (Scotland) Bill was also read a second time.

Royal Assent

On July 11th the Royal Assent was given in the House of Lords by Royal Commission to a number of Acts, including the Finance Act and the Prince of Wales's Hospital, Plymouth, Act.

Domiciliary Nursing Services

On July 10th, in the House of Commons, Sir G. HURST asked leave to bring in a Bill to enable local and county authorities to provide for domiciliary nursing services, to appoint and pay nurses, to provide accommodation for them, and to make reasonable subscriptions or donations to voluntary associations.

Leave was granted and the Bill was read a first time.

In the House of Commons on July 16th the Ministry of Health Provisional Order Confirmation (South Middlesex and Richmond Joint Hospital District) Bill was read the third time.

Road Accidents and Medical Treatment

In the House of Lords on Tuesday, July 17th, the Road Traffic Bill was considered in Committee. The Earl of ONSLOW was in the chair.

On clause 1 (which imposes a general speed limit of 30 miles an hour on built-up areas.)

Viscount CECIL moved an amendment to leave out the words in the clause which provided that the speed limit should not operate between midnight and 5 A.M.

The Earl of PLYMOUTH, speaking for the Government, said that out of 7000 fatal accidents on the roads in 1933, less than 160 occurred between midnight and 5 A.M. Less than half of these, 65, were in built-up areas. Of 3000 pedestrians killed in 1933, over 2700 were between the ages of 15 and 55, and most of such people would not be about on the roads between midnight and 5 A.M. There was also the difficulty of enforcing a speed limit during those hours.

The amendment was strongly supported by several noble lords and was agreed to.

Viscount BERTIE OF THAME moved a new clause providing that a person charged with driving a car when under the influence of drink or drugs should be subject, if so required, to be examined and tested with respect to his condition as soon as might be after his request by a registered medical practitioner selected by the police, and should have the right to be examined and tested also, if he so desired, by a doctor or other person selected by himself. He said that if the clause was accepted everybody would know that if they were charged with being drunk or under the influence of drugs while in charge of a motor-car they would be subjected to a medical examination, whether they consented or not.

The Earl of PLYMOUTH said that there was something in the proposal that where drunkenness was an element in an offence a person charged should not be able to prevent an examination which might help to ascertain his real condition. The clause, however, would go too far in some cases and not far enough in others. In practice it was often impossible for the police to decide until after a medical examination whether a charge ought properly to be brought or not, and a person might be ill and not under the influence of drugs or drink. The clause was too wide in that it subjected to risk of punishment a person who objected to conform to the test suggested. In practice the noble lord's proposal was not required. In any case where a person's condition was a matter of doubt, it was the well-established practice of the police to call in a doctor to examine him, and if he wished also to be examined by a doctor nominated by himself he was allowed to do so and the police had instructions to that effect. The truth was that medical examination did not lend itself to compulsion backed by legal sanction.

The new clause was withdrawn.

The Earl of PLYMOUTH, replying to a question by Earl HOWE with regard to the possibility of prohibiting the use of motor horns at certain hours at night, said that the Minister of Transport had had the matter under consideration. It was the Minister's intention to proceed cautiously and experimentally, and to select certain limited areas in which to prohibit the use of motor horns during certain hours of the night.

On clause 13 (payments and insurance in respect of emergency treatment of injuries arising from the use of motor vehicles on roads.

Lord SANDHURST moved to leave out the word "motor" so as to make the clause applicable to accidents caused by other forms of vehicles. He said they were doing their best to reduce accidents on the roads, and one of the most important things in that connexion was to create a spirit of good-will and helpfulness on the roads. If they were going to start a spirit of class destruction and encourage class war on the roads they would not get the spirit of helpfulness which was necessary. By the inclusion of the word "motor" in the Bill they were stigmatising one set of people. This would not do the medical profession a good service. At present doctors were only being paid for emergency treatment in respect of one-third of the road accidents. He saw no logical reason for that. If the doctors were going to collect thousands of fees at 12s. 6d. in respect of such treatment they should collect for all the accidents and not only for two-thirds of them. He agreed that they should do something to see that doctors were paid for their services, but the only way to do it was to see that every vehicle user shared the responsibility. That would encourage more vehicle users who were not motorists to be a little more careful.

The Earl of PLYMOUTH said he could not accept the amendment.

The amendment was negatived.

Lord SOMERLEYTON moved an amendment providing that the clause should apply not only to accidents on the roads but also to accidents in places to which the public had a right of access.

ADDRESSES AND ORIGINAL ARTICLES

CLIMATE AND HEALTH*

By S. WATSON SMITH, M.D., F.R.C.P. Edin.,
M.R.C.P. Lond.
HONORARY PHYSICIAN, ROYAL VICTORIA AND WEST HANTS HOSPITAL, BOURNEMOUTH

[Dr. Watson Smith commenced by extending a cordial welcome to Bournemouth to the members of the Association and their accompanying visitors in the name of the medical men of the town and neighbourhood and of the civic authorities of the borough. He recalled that it was 43 years since the annual meeting of the British Medical Association was held in Bournemouth, when Dr. John Robert Thomson, whose name, he said, was impressed upon the benevolent institutions of Bournemouth, occupied the presidential chair, that occasion being the 59th annual meeting of the Association.] With regard to the subject of the present address, the President said that he would begin by defining his subject and outlining the

History of Medical Climatology

In talking of climate we shall not try now to define the term in the Johnsonian fashion as "a space upon the surface of the earth, measured from the equator to the polar circles"; or in the sense used by Sir Thomas Browne, when he wrote (1643) that he was born in the eighth climate; or again, in the popular meaning, as a region differing from another by reason of the temperature of the air. We shall define it in a broader sense, the meaning of the word, modified by time and necessity, indicating all the solar and terrestrial factors and influences which affect animal and vegetable life, including sunlight, atmospheric temperature, humidity and pressure movement of the air, and prevailing winds—the factors which make our climate what it is; and, whilst including airs, also embracing waters and places. My remarks will also refer to the history of medical climatology and hydrology generally, and to the advisability of more frequent use of British spas and health resorts. In the choice of this subject it seemed to me that Bournemouth—fair as it is and so handsomely endowed by nature with beauty, grace, and charm—was a fitting place from which to speak. Alone of its kind and in the front rank of coastal health resorts, this area can claim to have restored health to invalids without number, and to have afforded rest and recreation for the many. Here, in Shakespeare's words, "The clymat's delicate, the ayre most sweet."

THE INFLUENCE OF GREECE

It is generally believed that, in the dawn of civilisation, from the Middle East and from the shores of the Mediterranean, migrations of a people, mainly pastoral, took place in consequence of drought, a changed climate causing insufficient sustenance for tribes and flocks; and that thus knowledge spread eastward to China (2300 B.C.)—where even to-day a superstitious belief survives in the malign effects of climatic influences (Fung-Shui, literally wind and water)—to Libya and Egypt, whence to Greece, whither many Egyptian ideas made their way.

In Greece medical knowledge and practice flourished, chiefly in the Cnidos Peninsula and in Rhodes, the "rose-covered" island of the Ægean, where climate and physical influences seem to have been specially studied by the Greek philosophers; and in Cos and at Epidaurus, where the cult of Asklepios first appears. At these places health temples were founded—originally sacred shrines controlled by priests, their sites being chosen, not only from proximity to wells or hot springs, but also with a view to climatic salubrity. At these temples patients would drink the waters and bathe; the sick would flock thither to be treated by the presiding priests, just as cure and relief are now sought by pilgrimage to a holy well. The extent to which such "spas" were used is shown by the provision for entertainment at the health temple of Epidaurus of an open-air theatre capable of accommodating 12,000 and of a stadium for 20,000.

Pausanias, in his "Description of Greece," mentions that whilst visiting Epidaurus he met a traveller from Sidon, who declared his opinion that Apollo was the sunshine and Asklepios, his son, the fresh air. His worship as the god of healing was widely spread among the Greeks. His powers included even that of raising the dead. In his honour temples were built at many places, the most notable, that of Epidaurus, becoming the traditional seat of the cultus of the god, originally probably a form of sun worship.

A salutary belief underlay the religion of Asklepios, that the maladies of the soul could be reached through the subtle gateways of the body; that, in the words of Walter Pater, "the body became but an handmaid of the soul." Thus the Greeks strove for perfect physical development, esteemed even above learning, their artists and philosophers employing their rare talents in the production of beauty and the search for truth. This idea of a *select* humanity was revealed in the Stoic plan of a world of the wise only, and in later Christian times found its expression in the conception of the Church as the only pathway to salvation for the human race.

The earliest surviving treatise on climatology is the chapter "Of Airs, Waters and Places" in the works of the immortal Hippocrates (460–370 B.C.), Father of Medicine, in which he deals with many questions of importance in public hygiene, giving numerous incidental references to the effects of weather and climate, winds, seasons, and localities. At this period Greek art and learning were at their zenith, instructing, edifying, and refining the world as they still ought to be doing. Hippocrates showed an extraordinary grasp of matters relating not only to climate and its causes, but also to the art of medicine; so much so that he founded a system of physic which embraced the results of actual observation in place of the superstition and hypothesis till then obtaining, and dominated medical practice for many centuries.

ROMAN DEVELOPMENTS AND MEDIÆVAL INACTION

In Rome, Scipio Africanus (died 129 B.C.) was one of the first to order the construction of baths. Later, in A.D. 21, thermæ were opened by Vipsanius Agrippa, son-in-law of Augustus and grandfather of Caligula. It became customary to build a large bath over a natural hot spring, attaching to it several smaller baths. The neighbourhood of these became fashionable watering-places. Authors like Petronius and Martial throw much light on Roman bathing. The latter, taking note of the smallest details, describes a visit to the public and private baths, each of which had its own regular customers. He watches the masseurs manipulating their patients, and a wily thief awaiting the right opportunity of pilfering from a bather's robe. It was usual for special bathing times to be allotted according to the rank and social status of the bather. Occasionally a bath would be used in common by the sexes; but such mixed bathing was forbidden by Trajan and by his successor Hadrian. In the reign of Justinian (A.D. 527–565), builder of St. Sophia, partitions were put up to separate the Byzantine sexes. During the Roman occupation of Britain spas and health resorts were founded, some of which, like Bath, "remain unto this day." London also had its medicinal wells and baths, the latter being early established there by the Romans.

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* Presidential Address (abstract), delivered on July 24th before the 102nd annual meeting of the British Medical Association held at Bournemouth.

In the obscure ages which succeeded the fall of the Western Empire the use of mineral springs dwindled, but after the Crusades (A.D. 1096–1272) warm baths again became fashionable, some associated with saints developing into centres of pilgrimage. During the fifteenth century the Greeks fled from fallen Constantinople, leaving their baths behind them for its conquerors, but taking with them into Italy their literature and learning, so that in the sixteenth century Hippocrates's work was again the example to follow in the practice of medicine.

FROM HARVEY UNTIL TO-DAY

At length the immortal Harvey, by his work *De Motu Cordis* (1628), a record of investigation made by the experimental method, overturned the whole theory of the ancients, founding principles and the practice of physic on the scientific basis whereon they now stand. Thomas Sydenham, Father of Clinical Medicine, "a rare man," laid great stress upon the seasonal variations of disease and the relation of disease-distribution to latitude.

At the end of the eighteenth and the beginning of the nineteenth century the climatic dangers of travel were demonstrated by the failure and destruction of the two expeditions into Africa of Mungo Park, himself a surgeon (see his *Travels*). But since the last few years of the nineteenth century a great improvement has taken place in tropical hygiene and sanitation. Many deadly climatic diseases are now known to be of parasitic origin, the constant warm climates of tropical regions rendering them the best breeding-ground for the organisms causing such diseases. Due to the direct effect of climate upon the parasites or their human or extra-human hosts, these diseases are fortunately absent from temperate and cold latitudes.

The second half of the nineteenth century was the scientific age, noted for its advances in medicine and surgery. Consequently, in the present century, many of the worst areas of the earth, where so many of our fellow-countrymen have been "climate-beaten" in the past, have been rendered wholesome and habitable for all races of mankind by pioneer work, done often under great risk to health and life, by colleagues of the profession. Such results have been brought about by the application of methods evolved by the original work of men like Patrick Manson, David Bruce, Ronald Ross, Andrew Balfour, and countless others, true pioneers of Empire, many of whom had passed on, forgotten by their own times, unhonoured and unsung; they constitute a splendid record of self-sacrificing labour on behalf of the civilisation and well-being of mankind, and afford a demonstration of that spirit and genius, the proud heritage and hall-mark of the profession of medicine.

In these days we seem to live in an age of transition, when each man's scientific knowledge and opportunities are expanding and increasing well-nigh beyond belief. Yet we find the same riddles presenting themselves for solution as in previous ages, merely changed in their scientific features. There must always be a demand for proof: a constant testing of our assumptions, investigations, and conclusions, to prove them true or false, and accordingly to receive or abandon them. The doctrines of science, many of which are now admittedly beyond dispute, at first confined to the scattered few, have been gradually gaining general acceptance. By the processes of trial and search for error they are constantly being clarified and corrected. Science, indeed, by its revelation of the established order of things, shares common ground with religion.

[Dr. Watson Smith, alluding to the belief that climate is the most influential of the natural causes controlling the destinies of mankind, pointed out that the chief factor governing climate was isolation, and continued:—]

Airs and Waters

An excessive exposure to light rays, whether natural or artificial, entail fatigue and exhaustion, but it also produces early degeneration of the skin, such as may be seen in sailors. The external ears, the lower half of the face, and the backs of the hands degenerate so as to exhibit a skin become thin, atrophied, and pigmented, upon which are grafted warty growths which, later, may assume a malignant form. Because of immediate and remote risks of over-radiation, caution should be advised in the use of the sun bath and of artificial light baths. But, properly and prudently used, sunlight is of inestimable value. From the point of view of the man of business alone it has been proved that daylight and industrial efficiency are directly proportional, the one measuring the other. Such efficiency may also be encouraged by the creation of a so-called artificial climate, mechanically controlled as to temperature, humidity, and movement of air, promoting ventilation indoors, which should be applicable with advantage to the modern hospital or school, and to places of business or amusement. But the sun is the ruler of all climates and determines temperature, the lessened or increased humidity of which has been used as a practical means of classifying climate as bracing and tonic, or sedative and relaxing: the former including busy places providing entertainment and excitement suitable for those needing bracing-up, an escape from routine business, and change from sedentary work; the latter qualifying resorts favourable to rest and tranquillity, beneficial in nervous complaints, such as insomnia, in high blood pressure, or in disorders of the heart and circulation. There are, however, in the British Isles, all gradations between the two extremes. The term "relaxing," in reference to climate, I use in no derogatory sense such as enervating, but as synonymous with "sedative," indicating the quiet and repose desirable for the relief of these and other conditions of ill-health, and the maladies of old age, compelling a slowing-down of the pace, and encouraging restful days and nights and a reduced metabolic rate.

THE ILL-INSTRUCTED PUBLIC

The ignorance of the majority as to the climate, and so the health resort, best suited for them is notorious. A careful study of an invalid's general state of health and mental traits should be made before recommending the suitable place. Often a climate with frequent but moderate variations will prove beneficial, the more so if combined with a regular rhythm of rest, sleep, open-air exercise, and a properly supervised and dispensed diet; beautiful surroundings, changes of scene and of manner of life, all helping to encourage the invalid. As our knowledge of applied climatology increases it will be found to be more and more of value as a factor in the successful treatment and diminution, or even elimination, of disease, the results of which, under differing climatic conditions in various parts of the world, and especially of the British Isles and Empire, will thus be tabulated and mapped out.

Waters and baths are to be looked upon as factors accessory to climate, over which they may have a dominating therapeutic influence. Spas frequently specialise in the treatment of particular ailments, and should be classified not only according to type of climate but also upon their therapeutic indications. Mineral waters have their pharmacological action by virtue of their water-content, and of the various contained chemical and physical properties. Some have radio-activity, a property of high value, which is being increasingly utilised in treatment; a quality, however, so evanescent as to be speedily dissipated on exposure, so that such water must be used immediately when drawn.

Although from a medical standpoint doubt has been cast upon the value of the chemical properties of spa waters, this doubt has been dispelled with a more exact knowledge of biochemistry, which has led to a correct interpretation of their action, and so of their medical use. Up to the middle of the nineteenth century, when medical climatology again came into prominence, spa practice was purely empirical. Now every resort with a claim to therapeutic value should develop its own resources along scientific lines. For, in the words of Fortescue Fox, "Each spa has its own individuality," which should be fostered and guided aright by utility in treatment and by a reasonable limitation of its reputed curative value, so that a wise choice may be made by a physician for the benefit of his patient. A family resemblance among spas as to their medical value should not too lightly be taken for granted, for how often has it not been repeated that we do not treat diseases, but those who suffer from them; and so with spas as places of treatment, the aim of which should be to enhance and profit by the climatic and other advantages of the place.

THE CHARACTERISTICS OF SPA WATERS: BRITISH CLAIMS

[Dr. Watson Smith then outlined the main characteristics of spa waters, dwelling on their biochemical action, their tonic advantages, and—which he termed a feature of cardinal importance—their replenary effects, or the results obtained by the regular replenishment of the circulation by a normal intake of water. He went on to point out that with the urbanisation of the country insufficient rest was a fruitful source of premature collapse, so that sedative sojourns or changes of climate formed a valuable escape from the nervous strains of modern life. He pointed out that while south coast resorts might bring relief to those suffering from essential arterial supertension, insomnia, or debility consequent on nervous stress and strain, the British Isles also abounded, on the east and west coasts, with bracing climates. He continued:—]

With advancing age, when "the years draw nigh, when thou shalt say, I have no pleasure in them," it is wise to take an interest in Nature, whose simple ways thus acquire a charm for us hitherto, maybe, unnoticed, and the lovely villages and backwaters of the countryside "bring the soul nearer to the divine source of all being." The temperature and changeable climate of the British Isles have in the past bred a vigorous, hardy race, able to face life in almost any part of the world. This must be considered one of the chief underlying causes of the formation and successful growth of the British Empire, fostered and encouraged by the great Queen in the nineteenth century. At the present time the fashionable rest cure appears to be the sea-cruise holiday in the sun, offering the completest rest possible for the healthy man, his whole mental outlook changing, as the waves carry him away for many days from shore conditions. For the healthy and vigorous nothing can be better; but for the invalid the discomforts of rough weather and sea-sickness, with the possibility of being "cabin'd, cribb'd, confined" in consequence, render such cruises of very questionable benefit.

Britain, being a most favoured land as to spas and health resorts, it is now generally understood in the profession that there is seldom, if ever, medical necessity to winter abroad, unless it be to obtain by altitude, or by dry or sea air, a suitable climate for the tuberculous or asthmatic. Moreover, the discomforts of travel, change of language and food, absence of home comforts and friends (to say nothing of the less satisfactory sanitary arrangements prevailing on the continent), can be more easily faced, nay, converted into sources of amusement, by the young, high-spirited, and healthy, than by the elderly or invalid. On the other hand, there is no doubt that continental or foreign travel, giving a complete change, may often be beneficial in cases of mental strain and nervous trouble; producing, as it does, a detachment from insular home prejudices, a broadening of outlook by unfamiliar scenes, manners, and customs, and encouraging an interchange of visits and courtesies from country to country.

Directions for Development

Whilst the duty, too often neglected, of increasing the amenities and preserving the beauties of health resorts and spas must primarily belong to public authorities, the scientific, sane, and right guidance of their development should naturally be the part of an educated medical profession. Both locally and generally the whole subject ought to be surveyed, reviewed, and tabulated. Such places are a national asset; the increase of their value to the national health should therefore be the concern of the State and of public bodies to support and encourage. The medical men on the spot, with their experience and local knowledge, must inevitably be the advisers as to type of patient and disease to be benefited and relieved by the resources available at the place in question. . . .

Medicinal springs and baths should be under a public control, ensuring regular chemical analyses, purity, ease of access to the waters, and the circulation of accurate information available alike for rich and poor, for doctor or patient, detailing such accessory matters as climate, environment, endowment of the place with natural beauties, and its mental and bodily advantages: in a word, the individuality of the neighbourhood, *genius loci*. At these health resorts the public is demanding additional methods of treatment, including all manner of baths. Besides providing medicinal, these resorts should offer a wide range of electrical, physical, and other external accessory means and methods for the re-education of body functions and of structures such as joints and muscles. So that an up-to-date watering-place wishing to prosper will do well not to be deficient in these respects or in available advice as to diet and mode of life best suited to the particular climate or malady.

The average hotel or boarding-house, no doubt, prefers catering for the healthy rather than for the sick. But the comfort and well-being of the latter are essential for the fair reputation or continued prosperity of any place calling itself a *health* resort, and could be fostered and maintained by a varied improvement of facilities for attendance and for the provision of various special diets. An admirable plan would include the provision in hotels catering for invalids of one or more State-registered nurses, responsible to the patient and his medical adviser, and to them only; an invalid annexe would be another device for the attraction and lodging of visitors not fitted for the ordinary daily routine of the healthy. Patients would be ambulatory or convalescent, not confined to bed or in need of any special medical attention.

There is much need for an increase at health resorts in the number of convalescent homes, suited to the means of all sections of the community, not excluding the over-burdened upper and middle classes. Such institutions, municipally or privately owned, administered perhaps under health insurance schemes, might be, so to speak, territorial or regional, used near a patient's home in finer months, or in the south or west in winter. Their cost would amply be repaid by increased efficiency in work of all descriptions, and by gradual elimination of the later stages of such maladies as those of the rheumatic or fibrositic type, which cause so much disablement with loss of time and wages. Our health resorts are in need of necessary, but sympathetic, reorganisation and improvement, much of which could be effected by a healthy rivalry in catering for the requirements of the jaded and sick, and by competition in the provision of the things that matter, among which are those of the mind. . . . Our health resorts should be equipped for mental as well as for corporal benefit. The provision of libraries, art galleries, and museums is as necessary, if not so patently urgent, as that of convalescent homes and baths; a day may come when the healing art will include advice as to suitable studies in art, science, and literature as mental tonics.

The advantages of our health resorts are not infrequently lost to the sick through doubt, indifference, or scepticism as to their real value; by bad and selfish building development; by destruction of natural beauty; by ugly as opposed to reasonable and beautiful forms of advertisement; by too much noise; or by a cost of living which it should be the aim of all sensible governments to reduce. Signs are not wanting, however, of good efforts to lay the foundations of a better state of things by a well-directed campaign of education as to the great advantages of British spas and resorts, not only to ourselves in these islands and to our kinsfolk abroad, but also to our neighbours on the continents of Europe and America.

ST. THOMAS'S HOSPITAL SAMARITAN FUND.—Last year 1505 patients were sent to convalescent homes by this fund at a cost of £3452, towards which they contributed £1116; the Samaritan Fund found £606. Surgical instruments were provided for 2392 patients, at a cost of £2213, towards which the patients contributed £1052. Convalescent homes received 946 patients from the wards and 559 from the out-patient and casualty departments.

GLANDULAR FEVER AND INFECTIOUS MONONUCLEOSIS[*]

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GLANDULAR fever may be described as an acute infectious disease characterised by fever, enlargement of the lymphatic glands, and changes in the blood, especially lymphocytosis. Pfeiffer gave it the name of *Drüsenfieber*, or glandular fever. Sprunt and Evans, in 1920, used the title "infectious mononucleosis" without recognising the identity of their cases with Pfeiffer's disease.

The discovery of the blood changes has established the existence of glandular fever as an entity, but the outbreaks of the last few years have revealed its extraordinarily protean nature. We shall subsequently divide it into three clinical groups: (1) a glandular type, mainly in children of 5 to 15 years; (2) an anginose type, also known as "monocytic angina"; and (3) a febrile type, mainly in young adults, in which "infective mononucleosis," as described by Sprunt in America, may be included.

Historical

The disease, in the sole form in which it was recognised until the last few years, was first fully described by Emil Pfeiffer in Germany in 1889, under the title of Drüsenfieber. Filatow, a Russian pædiatrist, had given a brief account of it in 1885, but this cannot be compared with Pfeiffer's. The essentials of his description are as follows:—

> "A child of 5 to 8 years of age is taken ill suddenly with fever, malaise and some discomfort in the neck. The glands in the neck, especially at the posterior border of the sterno-mastoid, are obviously swollen and painful. The fauces are somewhat reddened, but there is no exudation and the angina is not so extensive as to account for the high fever. The liver and spleen are palpable. Axillary and inguinal glands are never enlarged. The glands never suppurate and the course is always favourable. The fever lasts up to eight or ten days. The condition is infectious and occurs in epidemics."

Pfeiffer thus recognised that glandular fever was infectious and was a general infection although he overlooked the enlargement of the axillary and inguinal glands. He had no knowledge of any blood changes.

The historical vicissitudes of glandular fever are a matter of some interest. For 30 years after Pfeiffer's article was published discussion was confined entirely to the clinical aspects. As soon as it appeared, however, others recognised that they had seen the same syndrome. In the discussion which followed his communication, Heubner mentioned the occurrence of hæmorrhagic nephritis, and the occasional development of urticaria.

That the axillary and inguinal glands were usually enlarged was first noted by Desplats in 1894. In the same year Hörschelmann described a scarlatiniform eruption, and also the occurrence of severe membranous angina. In 1896 Park West published an account of 96 cases seen in the course of three years in a country district in Ohio. This is the first record of cases in America. The first article on glandular fever in Great Britain was written by Dawson Williams and appeared in THE LANCET in 1897. It was a good account of the disease commonly seen in children.

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[*] The Lumleian lectures for 1934, delivered to the Royal College of Physicians of London on March 15th and 20th.

By this time the attacks upon glandular fever as an entity had already begun. Neumann, in 1891, published a series of cases under the title of *Akute Idiopathische Halsdrüsenentzündung.* In half of these there was suppuration, and it is clear that this group had no relation to glandular fever. But it was claimed that they proved that glandular fever is only a local pyogenic cervical adenitis. (In point of fact, suppuration almost never occurs in glandular fever.) It was also suggested that it was secondary to rhinopharyngitis, as by Labbé in 1901. Many authors described it as a complication of influenza, amongst others Gallois in 1901, Delcourt in 1905, and Finkelstein and Fischl in Germany as late as 1924. Others ascribed it to intestinal intoxication (Hochsinger, Trautmann).

In 1908 Pfeiffer read a communication on the disease at the Kongress für innerer Medizin. This is his sole article on the subject apart from the original description in 1889. He added nothing of importance. No one discussed it and no notice was taken of it. Glandular fever had indeed been practically dead for some years previously. From 1906 to 1920 the medical journals of the world contain scarcely a score of articles on glandular fever, and few of these are of any interest. Between 1915 and 1920 I cannot find a record of a single paper with this title, although epidemics must have occurred amongst young soldiers in close quarters. (Burnford is the single observer, as far as I am aware, to whom the possibility occurred. In 1918 he suggested that a group of cases with pyrexia and enlarged glands belonged to Pfeiffer's Drüsenfieber.) Its memory was just kept alive by brief descriptions in general text-books on medicine, though not in works on diseases in children or infectious diseases, or on hæmatology, in which indeed at the present time it sometimes finds no place.

So far glandular fever had depended solely on its clinical features. The *hæmatological period* commenced in 1918 to 1920. During several years previously isolated cases of absolute lymphocytosis with recovery had been occasionally published, the recovery often being thought to be a "cure" of leukæmia due to some method of treatment. These recorded cases are few in number, and I have only been able to trace the following previous to 1918: Curschmann, 1906; Türk, 1907; Cabot, 1913; Marchand, 1913; Jackson and Smith, 1915; Hall, 1915; Ireland, Baetjer, and Ruhrah, 1915; and Eason, 1918.

Curschmann's is apparently the first record of a blood count in a case which may be not unreasonably accepted as glandular fever. It was diagnosed as abnormal mumps. The white cells numbered 50,000 per c.mm., and the lymphocytes 78 per cent.

Türk attracted some attention to his case by the dramatic account of his surprise when he met the patient in the street two weeks after giving a hopeless prognosis. He expressed the opinion that the condition "could not be regarded as more than a sublymphæmic lymphomatosis."

Cabot and Marchand unfortunately believed that the blood changes were due to sepsis, and this possible result of sepsis was accepted for some years, though now disbelieved.

Hall's communication marked an advance. He was the first author to become aware of previous articles, and he recognised that his case was closely similar to those described by Türk, Cabot, and Marchand. He consequently concluded that they were examples of some clinical entity still unknown at that time.

It may be noted that Breinl, Priestley, and Fielding in 1914 published in Australia an account of a local disease under the title Endemic Glandular Fever in the Mossman District, which has many resemblances to Pfeiffer's disease. Somewhat similar cases are described by Haberfeld of Vienna, which were seen by him whilst in Brazil. He attributed the infection to tick bites.

The first series of cases in which an absolute lymphocytosis was present was published by Deussing in 1918, under the title "Ueber diphtherieähnlicher Anginen mit lymphatischer Reaktion" (angina resembling diphtheria with a lymphatic reaction). His 12 cases were from an infectious diseases hospital and were examples of what subsequently became known as "monocytic angina."

He noted the enlarged glands, but accepted them as part of the reaction. His description of the mononuclear cells closely resembles modern descriptions of those in other types of glandular fever. He makes no mention of glandular fever.

He believed that the angina was of ordinary non-diphtheritic type and that the lymphocytosis was the result of a constitutional tendency to "lymphatic reaction" on the part of each individual patient, and did not recognise that he was dealing with the results of a special disease.

A similar paper was published in 1920 by Jagic and Schiffner on the lymphatic reaction in aphthous stomatitis.

In November, 1920, Sprunt and Evans, in America, published the first article in which the existence of an infectious lymphocytosis was clearly stated. They noted throat symptoms, the general glandular enlargement, the palpable spleen, and the invariably favourable prognosis. Their description of the types of cells fairly represents the appearances. They named the condition "infectious mononucleosis." This was an original nomenclature, which had never previously been used. They made no reference to Pfeiffer's glandular fever; indeed, for some time subsequently the identity of the two types was denied in America.

In March, 1921, Bloedorn and Houghton, also in America, published four similar cases under the title "acute benign lymphoblastosis." They did not recognise its infectious nature.

In March, 1921, Morley and I recorded the first case diagnosed as glandular fever in which the presence of a lymphocytosis was recognised. The patient was a boy aged 8 years, who had a typical attack of glandular fever. The blood showed a leucocyte count of 15,000 per c.mm., with 75 per cent. of lymphocytes. On reading Sprunt and Evans's article we were satisfied that the two groups were of the same origin.

Morse, in October, 1921, published two adult cases resembling Sprunt and Evans's, under the title of "glandular fever," and considered that the two conditions were identical. Longcope, in 1922, published 10 cases as "infectious mononucleosis (glandular fever)," and in 1923 Downey and McKinlay recorded 9 under the designation "acute lymphadenosis." Both papers contain good descriptions of the types of cells present. Indeed, Downey's is the classical and best study extant.

By 1925 the identity of the two conditions was accepted in Britain and America, but on the continent the existence of the entity was doubted for many years. During most of the decade 1920 to 1930, German and Austrian authorities were actively engaged in discussing the occurrence of "monocytic angina" and the "lymphatic reaction" without realising that these were cases of glandular fever. In England and America this discussion on monocytic angina has never aroused much interest and the condition has been accepted almost tacitly as a form of glandular fever. There is no appreciable literature on the subject in the English language.

The foreign authorities went astray from the start. They became obsessed with the idea that the development of the lymphocytosis was the result of a constitutional lymphatic tendency in the individual which was called into activity by the angina. They held that the angina was the initial morbid factor and that it did not differ from the angina which would provoke polynucleosis in other individuals. They did not recognise that they were dealing with an infectious disease of which both the angina and the lymphocytosis were a part.

Deussing's article has already been mentioned, but Schultz's communication on Monozytenangina in 1922, to the Congress for Internal Medicine, first attracted general attention to the subject. It was based on five cases (published by Baader) which were similar to Deussing's and were admitted as diphtheria to an infectious diseases hospital. Baader noted the unusually long duration of the angina and of the fever, also the generalised glandular enlargement and the palpable spleen. The membranous angina cannot be distinguished from diphtheria by its appearance. Schultz held that the cells were monocytes and not lymphocytes and that the blood changes were due to a constitutional lymphatic reaction. Though Schultz's views were widely accepted, lengthy discussions as to the nature of the cells took place (Baar, Hopmann, Preuss).

Criticisms of Schultz's views began to appear in German literature, first on the ground that the cells were lymphocytes, secondly because similar blood changes were reported in cases with much slighter faucial symptoms, and thirdly on the ground that the blood changes were symptoms of a "morbus" and not a constitutional abnormal reaction (Brogsitter, Kwasniewski and Henning, Schmidheiny). In 1927 Schultz with Mirisch agreed haltingly that the cells were lymphocytes, but refused to accept the identity of cases with and without angina in spite of the identity of the hæmatological changes and of the enlargement of the glands and spleen. They upheld the constitutional lymphatic reaction in their type.

The differentiation of monocytic angina from glandular fever and the theory of a constitutional lymphatic reaction thus continued and articles on the same lines followed up to 1929 from Hartwich, Lenhartz, Hrabowski, and Feer, and indeed are still appearing. As Nyfeldt says, "monocytic angina nearly pushed out glandular fever."

The argument that monocytic angina is glandular fever was put forward on the continent by Glanzmann in his monograph on Glandular Fever in 1930, by Nyfeldt in 1932, and by Lehndorff and Schwarz in various articles and in their monograph in 1932. The evidence for the identity of monocytic angina and glandular fever is as follows:—

(1) In epidemics of glandular fever, cases occur with and without angina of all grades, and between the two groups no difference can be found in the blood changes, the glandular swelling, and the enlargement of the spleen.

(2) The cases with membranous angina cannot be distinguished from monocytic angina.

(3) Similar changes in the mononuclear cell are found only in glandular fever and monocytic angina (except possibly in rubella), so far as is at present known.

(4) Monocytic angina differs from other forms of angina in (a) the long prodromal period; (b) the long duration of the angina and fever; (c) the general glandular enlargement; (d) the frequency of recrudescences.

It may now be accepted that monocytic angina is a type of glandular fever. It will be described clinically as the anginose type.

FEBRILE TYPE: THE ENGLISH EPIDEMIC OF 1930

During the years 1920–24 glandular fever must have been prevalent throughout this country. Epidemics occurred in many schools. Between 1925 and 1928 it was rare.

In 1930 there was an extensive epidemic in England, which differed widely from those previously recognised. It was characterised by especially attacking adults, by the prolonged and often severe pyrexia, by the occurrence of an eruption often indistinguishable from typhoid, and by the late onset of the glandular enlargement, often mild in degree, and of the lymphocytosis. At the beginning of May attention was drawn to the epidemic (Tidy); further evidence then quickly appeared from Krestin, Cantor, Evans and Robb, Balme, Loewy, and Hall. Cantor suggested that glandular fever of this type had three stages: (1) stage of onset, with pyrexia and malaise; (2) stage of eruption, from the fourth to the seventh or tenth day; and (3) stage of glandular enlargement, from the tenth day onwards. There is no doubt that this is correct, and expresses briefly the characters of this febrile type of glandular fever.

Parkes Weber and Rolleston especially called attention to the transient positive Wassermann reaction. The presence of an absolute lymphocytosis was noted by all observers. It develops in the third stage with the glandular enlargement.

By the autumn of 1930 the general clinical features of the outbreak were fairly clear. It was extensive over the south of England and extended to the north, but its unusual characters led to frequent errors of diagnosis, especially of influenza, typhoid, and other exanthemata. In October, 1931, a discussion of glandular fever was held at the Royal Society of Medicine, which was practically devoted to this epidemic. Series of cases were reported from Reading by Mills, and from Birmingham by Williams, as well as from London. There is little other literature on this outbreak or this type.

There can be no doubt that this is a type of glandular fever. Its course appears to represent the full development of glandular fever with a prodromal period, a stage of eruption, and a stage of glandular enlargement. Other types and varieties arise from certain phases of the full course being exaggerated and others being absent. It was practically confined to adults in 1930, but cases at younger ages are now known. There are only scanty records of previous epidemics of this type. Botschkowsky in 1900 in Russia, and Spencer in 1926 in America, appear to have seen epidemics. A single instance occurs among Longcope's cases published in 1922. Steinfield and Goldberg recorded a case in 1926. It is difficult to find other satisfactory examples.

One may wonder in what guise glandular fever will next make its appearance.

Ætiology

Distribution. — The disease has been recorded throughout Europe except in the extreme south, in North America, China, Australia, and the Falkland Islands. No case is reported from South Africa. With regard to the tropics, the only records are an epidemic in Trinidad described by Cochrane, and two cases in Manila described by Hasselmann. There is no satisfactory case from India.

Age-incidence.—Probably no age is immune to any type. It has been recorded at 4 months by Glanzmann, and at 70 years by Moir, but it is rare over 40 years. The glandular type is commonest between the ages of 6 and 15 years. In adults it tends to be very mild. The febrile type is most common and typical between the ages of 15 and 25 or 30 years. Infectious mononucleosis is a mild "febrile type," and occurs mainly at the same ages. The anginose type is most common between 10 and 25 years; it also occurs in young children, but is rarely of the same severity.

The incubation period appears to lie usually between

5 and 15 days. I have seen fairly definite examples at 5 and at 12 days.

The degree of infectivity is not high. Single cases will often occur in a family and no other child become infected. On the other hand, susceptibility appears to be almost universal. When two or three cases develop in a school and there is an opportunity for mass infection, it frequently happens that all the other children become infected. Droplet infection may be the mode of transmission. It is probable that the disease is infectious only in its early stages. Thus it is clear that the anginose type is practically non-contagious, the infectivity having already passed.

The duration of infectivity cannot be estimated from evidence at present available. As a working rule I would suggest isolation for one week after the temperature has become normal and the main mass of the glands has subsided, and in the absence of any faucial inflammation.

The duration of the infection in the subject is a different question. Recrudescences and recurrences are proof that it may linger for many weeks or months. There is no evidence as to its infectivity in such recurrences.

Sporadic cases have been thought to differ from epidemic cases in their greater severity, more marked blood changes, and lower degree of infectivity. On careful consideration I agree with Glanzmann that there is no difference between sporadic and epidemic cases.

Clinical Manifestations

When Pfeiffer first described glandular fever it appeared to be a simple entity, but it is now known that its manifestations are protean. Lehndorff and Schwarz describe two groups: (*a*) Pfeiffer's type, glandular enlargement prominent; and (*b*) anginose type, faucial changes prominent. They were unacquainted with the prolonged febrile type.

The essential features of glandular fever may be stated as: (1) fever, (2) glandular enlargement, (3) faucial affections, and (4) changes in the blood—i.e., lymphocytosis. The predominance of one feature separates different groups, but no "blood" group is recognised, and glandular fever can be considered in three main groups: (1) glandular or Pfeiffer's type, (2) anginose type (monocytic angina), (3) febrile type. It must be borne in mind that these are groups of the same disease, and consequently all intermediate forms occur.

GLANDULAR OR PFEIFFER'S TYPE

Age and sex.—The majority of cases occur between the ages of 6 and 15 years, but no age is immune.

Prodromal period.—There is commonly a prodromal period before the glandular enlargement of one to four days, usually one or two. It is rarely as long as six days, but possibly may even exceed this. It may appear to be completely absent.

The onset is usually fairly acute. Headache is often complained of and there are the usual features of malaise.

Faucial symptoms.—There is usually complaint of sore-throat at the onset, but on examination there is little to be seen. There may be some general reddening of the fauces, and one or both tonsils may be prominent and red, but without exudation. Occasionally there is some follicular tonsillitis. Pfeiffer's observation that the degree of glandular enlargement was out of proportion to the faucial changes still holds good in this type.

Fever.—The temperature is moderately raised during the prodromal period; it may reach 101° or even 103°. There is practically always pyrexia when the glands enlarge, the degree roughly corresponding to the acuteness of the onset and the size of the glands. The temperature generally falls rapidly as the glands diminish in size after three or four days, and usually reaches normal in the second week. With recurrence of glandular swelling the temperature tends to rise again.

Constitutional symptoms are slight. The patient does not appear to be seriously ill, and there is no anæmia. There is no eruption. The pulse and respiration are not unduly rapid for the temperature. Vomiting occasionally occurs and the bowels are apt to be constipated. Abdominal pain is not infrequent, but usually not at the onset. There may be a slight cough. Epistaxis is not uncommon and may be severe.

Enlargement of lymphatic glands is the predominating feature. All or any group of glands may be enlarged, but the cervical glands are pre-eminently affected. It is rare for other groups to be enlarged in their absence or to the same extent.

Cervical glands.—The enlargement of the cervical glands is commonly recognised within the first three days. The increase in size often takes place with great rapidity and a visible mass may develop in a few hours. The glands may, however, take two or three days to reach their maximum. A definite mass is usually unilateral; on the opposite side some smaller glands are palpable, and subsequently these may enlarge further. It is frequently stated that the left side is far more commonly affected than the right, but in my own experience I am unable to find any marked difference. The glands most characteristically enlarged are deep to the sternomastoid, about the middle of its length and somewhat below the level of the angle of the jaw. They are discrete and movable, and have a firm elastic consistency on palpation.

Any of the glands in the neck may be affected. Œdema of the skin and tissues is very rare. The pre-auricular, submaxillary, and submental lymphatic glands also are occasionally enlarged. The occipital glands are seldom palpable in this type. The degree of pain and tenderness is variable, but it is rare, though not unknown, for it to be severe. In younger children it may be completely absent. Torticollis has been observed several times, but only lasts a few days. Spasm of the muscles at the back of the neck may also occur and cause suspicion of meningitis.

Axillary glands.—These become palpable probably in 80 per cent. of cases, but nearly always after the cervical glands. They rarely exceed the size of hazel-nuts. A definite mass occasionally develops.

Inguinal glands.—These are less often enlarged than the axillary. There may be a chain of considerable size and extent. The epitrochlear glands are not infrequently palpable.

Parotid and salivary glands.—It is disputed whether or not the parotid and other salivary glands are ever involved. This is a question of some interest as glandular fever has been frequently diagnosed as "aberrant mumps." Very few instances are recorded (Hörschelmann in 1894, Haas in 1912), but Glanzmann states that he is certain that he saw six cases in the large outbreak in Berne. Personally I have never seen a case in which the parotid became affected. I have been in doubt several times between the diagnosis of glandular fever, mumps, and sepsis. The after records show that in such cases the condition is almost always sepsis.

Thoracic and mediastinal glands.—Pfeiffer in his original article noted the occurrence of cough which he attributed to pressure of retrotracheal glands, and von Starck in 1890 observed that the cough in glandular fever may have a convulsive character suggestive of whooping-cough. Several cases have been published giving evidence of pressure on the bronchi (Glanzmann, Tidy). This has been confirmed radiographically by Buttenwieser, Longcope, and Nelken.

Mesenteric glands.—The development of palpable masses with abdominal disturbances is often recorded, as by Park West. I have several times felt definite

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GLANDULAR OR PFEIFFER'S TYPE

Age and sex.—The majority of cases occur between the ages of 6 and 15 years, but no age is immune.

Prodromal period.—There is commonly a prodromal period before the glandular enlargement of one to four days, usually one or two. It is rarely as long as six days, but possibly may even exceed this. It may appear to be completely absent.

The onset is usually fairly acute. Headache is often complained of and there are the usual features of malaise.

Faucial symptoms.—There is usually complaint of sore-throat at the onset, but on examination there is little to be seen. There may be some general reddening of the fauces, and one or both tonsils may be prominent and red, but without exudation. Occasionally there is some follicular tonsillitis. Pfeiffer's observation that the degree of glandular enlargement was out of proportion to the faucial changes still holds good in this type.

Fever.—The temperature is moderately raised during the prodromal period; it may reach 101° or even 103°. There is practically always pyrexia when the glands enlarge, the degree roughly corresponding to the acuteness of the onset and the size of the glands. The temperature generally falls rapidly as the glands diminish in size after three or four days, and usually reaches normal in the second week. With recurrence of glandular swelling the temperature tends to rise again.

Constitutional symptoms are slight. The patient does not appear to be seriously ill, and there is no anæmia. There is no eruption. The pulse and respiration are not unduly rapid for the temperature. Vomiting occasionally occurs and the bowels are apt to be constipated. Abdominal pain is not infrequent, but usually not at the onset. There may be a slight cough. Epistaxis is not uncommon and may be severe.

Enlargement of lymphatic glands is the predominating feature. All or any group of glands may be enlarged, but the cervical glands are pre-eminently affected. It is rare for other groups to be enlarged in their absence or to the same extent.

Cervical glands.—The enlargement of the cervical glands is commonly recognised within the first three days. The increase in size often takes place with great rapidity and a visible mass may develop in a few hours. The glands may, however, take two or three days to reach their maximum. A definite mass is usually unilateral; on the opposite side some smaller glands are palpable, and subsequently these may enlarge further. It is frequently stated that the left side is far more commonly affected than the right, but in my own experience I am unable to find any marked difference. The glands most characteristically enlarged are deep to the sternomastoid, about the middle of its length and somewhat below the level of the angle of the jaw. They are discrete and movable, and have a firm elastic consistency on palpation.

Any of the glands in the neck may be affected. Œdema of the skin and tissues is very rare. The pre-auricular, submaxillary, and submental lymphatic glands also are occasionally enlarged. The occipital glands are seldom palpable in this type. The degree of pain and tenderness is variable, but it is rare, though not unknown, for it to be severe. In younger children it may be completely absent. Torticollis has been observed several times, but only lasts a few days. Spasm of the muscles at the back of the neck may also occur and cause suspicion of meningitis.

Axillary glands.—These become palpable probably in 80 per cent. of cases, but nearly always after the cervical glands. They rarely exceed the size of hazel-nuts. A definite mass occasionally develops.

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FEBRILE TYPE: THE ENGLISH EPIDEMIC OF 1930

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In 1930 there was an extensive epidemic in England, which differed widely from those previously recognised. It was characterised by especially attacking adults, by the prolonged and often severe pyrexia, by the occurrence of an eruption often indistinguishable from typhoid, and by the late onset of the glandular enlargement, often mild in degree, and of the lymphocytosis. At the beginning of May attention was drawn to the epidemic (Tidy); further evidence then quickly appeared from Krestin, Cantor, Evans and Robb, Balme, Loewy, and Hall. Cantor suggested that glandular fever of this type had three stages: (1) stage of onset, with pyrexia and malaise; (2) stage of eruption, from the fourth to the seventh or tenth day ; and (3) stage of glandular enlargement, from the tenth day onwards. There is no doubt that this is correct, and expresses briefly the characters of this febrile type of glandular fever.

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There can be no doubt that this is a type of glandular fever. Its course appears to represent the full development of glandular fever with a prodromal period, a stage of eruption, and a stage of glandular enlargement. Other types and varieties arise from certain phases of the full course being exaggerated and others being absent. It was practically confined to adults in 1930, but cases at younger ages are now known. There are only scanty records of previous epidemics of this type. Botschkowsky in 1900 in Russia, and Spencer in 1926 in America, appear to have seen epidemics. A single instance occurs among Longcope's cases published in 1922. Steinfield and Goldberg recorded a case in 1926. It is difficult to find other satisfactory examples.

One may wonder in what guise glandular fever will next make its appearance.

Ætiology

Distribution. — The disease has been recorded throughout Europe except in the extreme south, in North America, China, Australia, and the Falkland Islands. No case is reported from South Africa. With regard to the tropics, the only records are an epidemic in Trinidad described by Cochrane, and two cases in Manila described by Hasselmann. There is no satisfactory case from India.

Age-incidence.—Probably no age is immune to any type. It has been recorded at 4 months by Glanzmann, and at 70 years by Moir, but it is rare over 40 years. The glandular type is commonest between the ages of 6 and 15 years. In adults it tends to be very mild. The febrile type is most common and typical between the ages of 15 and 25 or 30 years. Infectious mononucleosis is a mild "febrile type," and occurs mainly at the same ages. The anginose type is most common between 10 and 25 years ; it also occurs in young children, but is rarely of the same severity.

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The degree of infectivity is not high. Single cases will often occur in a family and no other child become infected. On the other hand, susceptibility appears to be almost universal. When two or three cases develop in a school and there is an opportunity for mass infection, it frequently happens that all the other children become infected. Droplet infection may be the mode of transmission. It is probable that the disease is infectious only in its early stages. Thus it is clear that the anginose type is practically non-contagious, the infectivity having already passed.

The duration of infectivity cannot be estimated from evidence at present available. As a working rule I would suggest isolation for one week after the temperature has become normal and the main mass of the glands has subsided, and in the absence of any faucial inflammation.

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Sporadic cases have been thought to differ from epidemic cases in their greater severity, more marked blood changes, and lower degree of infectivity. On careful consideration I agree with Glanzmann that there is no difference between sporadic and epidemic cases.

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When Pfeiffer first described glandular fever it appeared to be a simple entity, but it is now known that its manifestations are protean. Lehndorff and Schwarz describe two groups: (*a*) Pfeiffer's type, glandular enlargement prominent; and (*b*) anginose type, faucial changes prominent. They were unacquainted with the prolonged febrile type.

The essential features of glandular fever may be stated as: (1) fever, (2) glandular enlargement, (3) faucial affections, and (4) changes in the blood—i.e., lymphocytosis. The predominance of one feature separates different groups, but no "blood" group is recognised, and glandular fever can be considered in three main groups: (1) glandular or Pfeiffer's type, (2) anginose type (monocytic angina), (3) febrile type. It must be borne in mind that these are groups of the same disease, and consequently all intermediate forms occur.

GLANDULAR OR PFEIFFER'S TYPE

Age and sex.—The majority of cases occur between the ages of 6 and 15 years, but no age is immune.

Prodromal period.—There is commonly a prodromal period before the glandular enlargement of one to four days, usually one or two. It is rarely as long as six days, but possibly may even exceed this. It may appear to be completely absent.

The onset is usually fairly acute. Headache is often complained of and there are the usual features of malaise.

Faucial symptoms.—There is usually complaint of sore-throat at the onset, but on examination there is little to be seen. There may be some general reddening of the fauces, and one or both tonsils may be prominent and red, but without exudation. Occasionally there is some follicular tonsillitis. Pfeiffer's observation that the degree of glandular enlargement was out of proportion to the faucial changes still holds good in this type.

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The differentiation of monocytic angina from glandular fever and the theory of a constitutional lymphatic reaction thus continued and articles on the same lines followed up to 1929 from Hartwich, Lenhartz, Hrabowski, and Feer, and indeed are still appearing. As Nyfeldt says, "monocytic angina nearly pushed out glandular fever."

The argument that monocytic angina is glandular fever was put forward on the continent by Glanzmann in his monograph on Glandular Fever in 1930, by Nyfeldt in 1932, and by Lehndorff and Schwarz in various articles and in their monograph in 1932. The evidence for the identity of monocytic angina and glandular fever is as follows :—

(1) In epidemics of glandular fever, cases occur with and without angina of all grades, and between the two groups no difference can be found in the blood changes, the glandular swelling, and the enlargement of the spleen.

(2) The cases with membranous angina cannot be distinguished from monocytic angina.

(3) Similar changes in the mononuclear cell are found only in glandular fever and monocytic angina (except possibly in rubella), so far as is at present known.

(4) Monocytic angina differs from other forms of angina in (*a*) the long prodromal period ; (*b*) the long duration of the angina and fever ; (*c*) the general glandular enlargement ; (*d*) the frequency of recrudescences.

It may now be accepted that monocytic angina is a type of glandular fever. It will be described clinically as the *anginose* type.

FEBRILE TYPE: THE ENGLISH EPIDEMIC OF 1930

During the years 1920–24 glandular fever must have been prevalent throughout this country. Epidemics occurred in many schools. Between 1925 and 1928 it was rare.

In 1930 there was an extensive epidemic in England, which differed widely from those previously recognised. It was characterised by especially attacking adults, by the prolonged and often severe pyrexia, by the occurrence of an eruption often *indistinguishable* from typhoid, and by the late onset of the glandular enlargement, often mild in degree, and of the lymphocytosis. At the beginning of May attention was drawn to the epidemic (Tidy); further evidence then quickly appeared from Krestin, Cantor, Evans and Robb, Balme, Loewy, and Hall. Cantor suggested that glandular fever of this type had three stages: (1) stage of onset, with pyrexia and malaise; (2) stage of eruption, from the fourth to the seventh or tenth day; and (3) stage of glandular enlargement, from the tenth day onwards. There is no doubt that this is correct, and expresses briefly the characters of this febrile type of glandular fever.

Parkes Weber and Rolleston especially called attention to the transient positive Wassermann reaction. The presence of an absolute lymphocytosis was noted by all observers. It develops in the third stage with the glandular enlargement.

By the autumn of 1930 the general clinical features of the outbreak were fairly clear. It was extensive over the south of England and extended to the north, but its unusual characters led to frequent errors of diagnosis, especially of influenza, typhoid, and other exanthemata. In October, 1931, a discussion of glandular fever was held at the Royal Society of Medicine, which was practically devoted to this epidemic. Series of cases were reported from Reading by Mills, and from Birmingham by Williams, as well as from London. There is little other literature on this outbreak or this type.

There can be no doubt that this is a type of glandular fever. Its course appears to represent the *full* development of glandular fever with a prodromal period, a stage of eruption, and a stage of glandular enlargement. Other types and varieties arise from certain phases of the full course being exaggerated and others being absent. It was practically confined to adults in 1930, but cases at younger ages are now known. There are only scanty records of previous epidemics of this type. Botschkowsky in 1900 in Russia, and Spencer in 1926 in America, appear to have seen epidemics. A single instance occurs among Longcope's cases published in 1922. Steinfield and Goldberg recorded a case in 1926. It is difficult to find other satisfactory examples.

One may wonder in what guise glandular fever will next make its appearance.

Ætiology

Distribution. — The disease has been recorded throughout Europe except in the extreme south, in North America, China, Australia, and the Falkland Islands. No case is reported from South Africa. With regard to the tropics, the only records are an epidemic in Trinidad described by Cochrane, and two cases in Manila described by Hasselmann. There is no satisfactory case from India.

Age-incidence.—Probably no age is immune to any type. It has been recorded at 4 months by Glanzmann, and at 70 years by Moir, but it is rare over 40 years. The glandular type is commonest between the ages of 6 and 15 years. In adults it tends to be very mild. The febrile type is most common and typical between the ages of 15 and 25 or 30 years. Infectious mononucleosis is a mild "febrile type," and occurs mainly at the same ages. The anginose type is most common between 10 and 25 years; it also occurs in young children, but is rarely of the same severity.

The incubation period appears to lie usually between

papular eruption, or, as some observers prefer, a roseolar eruption. The spots are commonly 2 to 5 mm. in diameter, pink or pinkish-brown in colour, and may disappear on pressure. In number they are generally scanty, about eight to ten spots, but they may be fairly numerous. They are distributed principally on the front of the trunk, but may also be scattered over the back and limbs, and a few spots rarely may appear on the face. They are not irritable. A crop fades in about four days. There is usually only one crop, but further crops may develop or may appear in a relapse. The eruption thus presents a close resemblance to typhoid. Sometimes the spots are more raised and rather larger than typhoid, but in others it is difficult to find any point of differentiation.

An eruption does not always develop. It is difficult to estimate its frequency. It was present in nearly every adult case which I saw in 1930, but if scanty it is easily overlooked.

The constitutional symptoms become more marked during this stage. The temperature rises to 102° to 104° at the onset of the eruption. It is usually sustained during the presence of the rash, then becomes remittent and tends to fall gradually. The pulse-rate may remain at about 100. Sweating is often profuse, and rigors may occur. Epistaxis is not uncommon. Gastro-intestinal symptoms are usually slight or absent, though there may be constipation with some abdominal distension. Vomiting is rare. Occasionally there is complaint of abdominal pain towards the end of the stage. The spleen is not usually palpable. The Wassermann reaction occasionally becomes positive during this period.

The duration of this stage, until the glandular enlargement appears, is commonly 10 to 14 days, but may be three weeks. Towards the end there may be considerable exhaustion. The diagnosis of typhoid fever is frequently made, in spite of the negative agglutination and bacteriological tests.

Stage of glandular enlargement.—The lymphatic glands commonly become palpable about the end of the third week, between the eighteenth and twenty-fifth days. There is considerable variation, and the limits may be stated as the tenth to the thirtieth days. The groups which enlarge are the same as in the glandular type, but they rarely attain to the same size. They may be slightly tender, but are often discovered on routine examination due to the rise of temperature. They may continue to increase in size for several days. The spleen often becomes palpable during this period, but rarely is more than one or two fingers-breadth below the costal margin. Faucial symptoms are uncommon.

The temperature generally rises again with the development of the glands, and may reach 102° or even 104°. It is usually remittent for about two weeks and then becomes intermittent and gradually falls to normal in the course of a further two or more weeks. The constitutional symptoms usually ameliorate during this stage, though there is often considerable exhaustion. The Wassermann reaction is positive in this stage in a considerable proportion of cases, but it becomes negative before the temperature reaches normal.

The duration of this stage may be prolonged. It lasts until the temperature is normal and the main swelling of the glands has subsided. The duration of the temperature is usually about four weeks, but may be many weeks or even months. Convalescence then gradually sets in.

Relapses and recurrences are not uncommon. An eruption may appear for the first time and a short course of rash and glandular enlargement may be passed through. In other cases there are recurrent rises of temperature which may prolong the course over many months. With these rises the glands may or may not enlarge, but in general the longest pyrexias are associated with comparatively slight enlargement of the superficial glands.

Variations in Clinical Types

Infectious mononucleosis.—The type of glandular fever described in America as infectious mononucleosis especially occurs among young adults—e.g., students and nurses. The general course resembles the febrile type of a mild degree.

Infants and young children.—Glandular fever is rarer at such ages than in older children and younger adults, and is not usually severe, although all three types occur. The course is often less typical, and may exhibit features of all types in a short period. Rashes are variable, and the rubelliform type is commoner than the maculo-papular. The rash may occur at any stage, either before, after, or with the glandular enlargement. The blood may exhibit rapid and marked changes, and counts above 40,000 leucocytes are confined to infants and young children.

Visceral forms.—The visceral glands may enlarge in glandular fever. The enlargement of thoracic and abdominal glands has already been referred to.

More obscure are cases with abdominal pain and absolute lymphocytosis, and no palpable glands, peripheral or otherwise. The cases recorded vary widely in their clinical course. Many have been characterised by prolonged pyrexia, severe constitutional symptoms, and enlarged spleen and liver, the duration being up to many months. But milder courses are met with. Appendicitis may be simulated. Finally, there are cases with no more manifestation than a transient lymphocytosis discovered by chance. There is no conclusive evidence for the diagnosis of glandular fever in many of these since there may be other factors at present unknown. Many cases have been published, all of which have recovered (Glanzmann, Mills, Schmidheiny, Tidy, Parkes Weber, Wilson, and Cunningham).

Eruptions

There is no characteristic eruption constant for all types. In the glandular and anginose types eruptions are rare—especially among children between 6 and 15 years of age. Urticaria occasionally develops. Amongst younger children and infants eruptions are more frequent and variable, and may be urticarial, erythematous, or rubelliform.

Character of eruptions.—There are two important types: (1) a macular eruption in the febrile type, and (2) a rubelliform eruption, mainly in young children. In the febrile type, in the English 1930 epidemic, the rash was a prominent feature and present in the majority of cases. It was usually referred to as a maculo-papular or roseolar eruption, and closely resembles enteric. It has been described fully in the section on the febrile type. It is rare in childhood. In the ordinary course it fades before the glands become palpable; this is almost invariably so in adults. The rubelliform eruption occurs mainly among young children. It may appear at the onset, before or with the glandular enlargement, or later in the attack. Glanzmann is convinced that in many cases it is indistinguishable from rubella, and also that the occipital glands are frequently enlarged. As in rubella, the eruption may be confluent in parts and discrete in others. Other authorities describe it as scarlatiniform.

Eruptions may develop which have been variously abdominal masses which have subsequently disappeared, but I doubt if they are common.

Spleen and liver.—The spleen is frequently palpable. It is difficult to say how often; in half the cases at least. The enlargement is rarely more than one or two fingers-breadth below the costal margin and it is not tender. Its presence and its size bear no relation to the severity of the attack. There is no rule as to when it appears in the course of the glandular type, but it is usually later than the glands. It may persist for long periods, even months or years after the attack has passed. The liver may also enlarge, as Pfeiffer noted, but this is rarely a marked feature and is not often tender.

Course.—The definite mass of glands rarely remains more than two or three days and then subsides rapidly. The temperature falls with the glands and the fall may be so rapid as to suggest a crisis. The general symptoms subside at the same time. This is often the termination of the acute attack and convalescence sets in. The glands, however, though much smaller, are often palpable for a considerable period, and have been known to persist for more than a year. Suppuration of the glands and septic complications are no part of the ordinary course of glandular fever and are extremely rare.

Recrudescences are very common. If the main mass has been confined to one side, the other side may subsequently enlarge. This may be while the initial mass is still present or after it has diminished. The pyrexia and symptoms return, and the course is similar to the original attack.

Recurrences may take place after considerable periods of freedom and are not uncommon after several weeks. There may be several recurrences over a period of three or four months, the severity gradually decreasing. In rare cases they have extended over several years.

Convalescence.—Immediate convalescence is rapid, except in cases with recurrence. There is, however, a definite tendency for a long period of slight but appreciable debility to follow an attack. Some degree of anæmia may develop. This may last for 6 to 12 months, but leaves no permanent results or ill-effects.

Prognosis.—The final prognosis is uniformly good in the absence of rare complications, and there are no permanent ill-effects.

ANGINOSE TYPE

(Monocytic Angina)

The type which will be described here principally refers to cases in which a membrane is present on or near the tonsils clinically indistinguishable in its appearance from diphtheria. Diphtheria bacilli are absent. Various cocci are present, and Plaut-Vincent organisms are often found. This type is rarer than the glandular form, and it is not infectious at this stage. It is commonest between 10 and 25 years of age, and under 10 years it is rarely severe. It must be noted that lesser grades of faucial change may be associated with a similar course.

There is a prodromal period of considerable length, from one to three weeks, during which there is increasing malaise and pyrexia, without any definite physical signs. Complaints of the throat begin to be made, at first slightly and then more seriously. On examination the membrane may already be formed. The temperature often reaches 104°. More rarely the angina may develop in the course of a glandular type, but it does not occur as an initial symptom. The tonsils, if seen before the development of the membrane, are red and swollen. The membrane when formed has the colour and distribution of that of diphtheria, is indistinguishable from it, and it may be unilateral or bilateral. The uvula is frequently œdematous and the membrane may extend over it. The breath may be odourless or with varying degrees of fœtor.

Peritonsillar œdema is common, but a tonsillar abscess is rare. Even when this occurs, suppuration of the lymphatic glands seldom follows, though many of the recorded cases of suppuration in glandular fever have been in this type.

Membrane never forms in the nose and never in the larynx. There may be severe discomfort from œdema of the tissues, but laryngeal obstruction is unknown.

The cervical lymphatic glands are always enlarged by the time the membrane is present, but they do not form such large masses as in the glandular type. Œdema of the neck and considerable tenderness is common at the height of the faucial changes and palpation of the cervical glands may be difficult. Some axillary glands are palpable in most cases. The spleen may be palpable, but perhaps less often than in the glandular type.

There is considerable discomfort and mental anxiety when the faucial changes are at a maximum, especially with œdema of the neck, but the constitutional disturbances are not in proportion to these features or to the temperature, and the patient usually looks fairly well. The heart does not suffer, either temporarily or subsequently. Eruptions are practically unknown.

General course.—The membrane may persist for many days, unlike that of diphtheria. As it separates the fever tends to fall, the fauces become more comfortable, and convalescence is often rapid. In some cases, however, pyrexia, about 100°, may persist for several weeks. This is sometimes due to recurrences which are not infrequent, but rarely attain the severity of the original attack. The special complications which occur in diphtheria are unknown. Diphtheritic antiserum has no effect. A few fatalities have resulted from broncho-pneumonia and general sepsis, but apart from these, recovery has been complete and there are no permanent ill-effects.

FEBRILE TYPE

There is a fairly characteristic course for this type in adults, although many variations occur. In children the course and sequence of the manifestations are less constant and rarely so severe. Three stages may be recognised:—

Stage of invasion.—The onset is usually sudden with headache, malaise, and a temperature of 102° to 103°. There may be one or two rigors. Less often the onset is insidious and vague. Sore-throat is rarely complained of in adults, though the fauces may be reddened. Headache is frontal and often occipital and may be so severe as to suggest meningitis. The face is flushed and the skin moist. Photophobia and conjunctivitis are common. There is no enlargement of glands or spleen at this stage. Gastro-intestinal symptoms are absent. There is no regular course for the temperature. The pulse is not specially rapid and when the temperature is high the rate may be disproportionately slow.

The stage lasts until the appearance of the eruption, and thus has a duration commonly of three to seven days, but it may be as long as ten days.

Stage of eruption.—The rash appears usually between the fourth and seventh days, most commonly on the fourth or fifth. It may be delayed as long as the tenth day. The most common type consists of macules or papules, and may be described as a maculothe demonstration of the existence of this antigen and of its immunological significance.

Four strains, representing the two extreme types described in the previous paper (Felix and Pitt[2]), were selected for the preparation of vaccines and were used for the immunisation of mice, since Grinnell[3] and Perry, Findlay, and Bensted[4] had shown that the mouse is a very suitable experimental animal for virulence and protection tests with *B. typhosus*. The vaccines were saline suspensions of 24 hour agar cultures, standardised by opacity and killed by heating for 1½ hours at 58° C. Mice weighing between 26 and 28 g. were inoculated subcutaneously at three days' interval, the first dose containing 200 × 10⁶, the second 400 × 10⁶ organisms. Twenty-four days later the test dose was inoculated, intraperitoneally, consisting of 2 M.L.D. (= 200 × 10⁶ organisms) of our most virulent inagglutinable strain Ty 2. The technical details observed in this and the subsequent infection experiments have been described in the previous paper.[2]

It is seen (Table I.) that the two vaccines prepared from inagglutinable and highly virulent strains conferred a very high degree of protection, whereas those made from the two agglutinable strains of low virulence were devoid of protective action. The clear-cut result of this experiment permitted one interpretation only—i.e., that the factor responsible for inagglutinability and virulence is an antigen and that the corresponding antibody is a powerful protecting agent. Attempts were therefore made to demonstrate this antibody by in-vitro tests.

TABLE I.—*Active Immunisation*

Vaccines used for the immunisation of mice.		Number of mice tested by intraperitoneal inoculation of strain Ty 2 (200 ×10⁶ organisms).	
Strain.	Type.	Tested.	Survived.
Ty 2	Inagglutinable smooth. Virulence high.	20	18
Gigliotti.		19	17
Ty 8	Agglutinable smooth. Virulence low.	22	1
Rawlings.		20	1
Controls with normal mice—			
Full test-dose (200 ×10⁶ organisms)		20	0
Half test-dose (100 ×10⁶ organisms)		16	0

Demonstration of the Virulence Antigen (Vi)

Previous experiments with inagglutinable and agglutinable smooth strains had failed to reveal any antigenic difference between the two types. Suspensions of the inagglutinable or resistant strains, when used in the living state in agglutination and absorption tests, were unable to react with the O antibody. However, when killed by heat or by treatment with various chemicals these suspensions were agglutinated by O immune serum to titre limit and quantitative absorption tests with standardised suspensions showed that sensitive and non-sensitive strains did not differ in their content of the smooth O antigen. Furthermore, in rabbit immune sera prepared by inoculation of inagglutinable strains, killed by heating at 60° C., no residual agglutinin for the homologous strain was demonstrable when the O agglutinin had been removed by absorption with an agglutinable strain. These results seemed to justify the statement made in the previous paper[2] that the two types of strain did not differ in their antigenic composition.

Although the protection experiment recorded in Table I. clearly indicated the presence in the inagglutinable strains of a separate antigen which withstood heating to 58° C., it was thought possible that this treatment might impair its agglutinogenic value and thus preclude the demonstration of the corresponding antibody by agglutination methods. Rabbits were therefore immunised with suspensions of living organisms of the two types of *B. typhosus* and control rabbits were inoculated with suspensions heated at various temperatures. The strain "Mrs. S." which had been used in earlier experiments by Ledingham[5] and Arkwright[6] was also included in the series; this strain is of the type of intermediate agglutinability and virulence and represents the most common type of *B. typhosus*.

Four intravenous inoculations were given at intervals of two days. The suspensions of living organisms and those killed by heating at 58° C. were each time freshly prepared from 24 hour agar cultures, while those heated at 70° C. and 100° C. were prepared in bulk and stored in the cold. The total number of organisms inoculated is stated in the Table. One week after the last inoculation blood was drawn from the jugular and tested against fresh saline suspensions of living organisms of the inagglutinable and agglutinable types. The technique of the agglutination tests was the same as described in the previous paper.[2]

It is seen from Table II. that the immunisation with living organisms of the three inagglutinable strains and of the intermediate strain "Mrs. S." led to the production of an antibody which was absent from the sera of the rabbits inoculated with living agglutinable organisms and also from those immunised with heated suspensions of the two most virulent and inagglutinable strains Ty 2 and Gigliotti. The symbol "Vi" is used for this antibody, since it is proposed to designate the new antigen as the "Virulence antigen" and to refer to it as the "Vi" antigen.

TABLE II.—*Agglutination Test*

Rabbits immunised with strains of *B. typhosus*.				Titres of the antibodies present in the sera.		
Rabbit.	Type of strain.	Strain.	Dose in million of organisms.	H	O	Vi
	Inaggl. Virulence high.	Ty 2—				
62		Live	800	10,000	5,000	400
63		Heated 1½ hrs. at 58°	800	20,000	20,000	0
64		„ 1 hr. „ 70°	800	1,000	5,000	0
65		„ 1 „ „ 100°	800	200	20,000	0
		Gigliotti—				
67		Live	800	5,000	5,000	100
68		Heated 1½ hrs. at 58°	800	10,000	20,000	0
69		„ 1 hr. „ 70°	800	2,000	20,000	0
70		„ 1 „ „ 100°	800	0	20,000	0
74		Watson. Live ..	800	5,000	2,000	200
75	Intermediate.	"Mrs. S." Live ..	800	20,000	10,000	50
71	Aggl. Virulence low.	Ty 8. Live	1600	20,000	5,000	0
72		Ty 901. Live	1600	20,000	10,000	0
73		Rawlings. Live ..	1600	5,000	20,000	0

Titre 0 = a negative result in a dilution of 1 in 20.
Aggl. = agglutinable.

The Vi antibody is capable of clumping the inagglutinable strains, whereas the O antibody is unable to produce this effect. The macroscopic appearance of the Vi agglutination is very similar to that of O agglutination: small granules of uniform size are formed, which settle slowly and leave the supernatant fluid perfectly clear. The titre of this described as urticaria, erythema nodosum, or morbilliform. These are usually transient. Rolleston saw a case diagnosed as typhus. Goldman observed absolute lymphocytosis in a case diagnosed as chicken-pox. Herpes labialis has been recorded many times. I have never seen it in the ordinary glandular type.

Complications

Sepsis.—Suppuration of the glands is no part of glandular fever. Secondary infections must naturally sometimes occur, but are very rare. In infants retropharyngeal abscess may develop ending in suppuration of the glands. Glanzmann had only one case of suppuration amongst many hundreds of cases in infants and children. Personally I have never seen the glands suppurate.

The rarity of suppuration is especially striking in the anginose type; although suppuration often appears imminent, it rarely develops. Nevertheless many of the recorded cases have been in this type. In the febrile type there is no record of the occurrence of suppuration. The rarity of sepsis applies also to such complications as otitis media, mastoiditis, and antritis. When they occur the course is usually benign.

Epistaxis is not uncommon. It may occur at any time in the course. It may be so severe as to cause anæmia. In the febrile form it may be severe before the glands enlarge.

Hæmaturia was mentioned by Heubner in speaking on Pfeiffer's original communication. In 1921 Morley and I collected the statistics of 270 cases of glandular fever, which gave an incidence of 6 per cent. for hæmaturia. It may be the first symptom for which a doctor is consulted. It is uncertain whether it should be regarded as "acute hæmorrhagic nephritis," or as a simple bleeding. In any case it appears to be a harmless manifestation. I have watched several cases over a course of years and I have never known nephritis to develop. Hæmaturia may occur in any type, and is not commoner in the anginose type or with severe sore-throats. Large epidemics have been recorded without any example.

Purpura and skin hæmorrhages are extremely rare. Altogether I can only find five recorded cases (Downey and McKinlay, Königsberger, Lewin, Minot, and Williams). These were severe but complete recovery occurred in all. In Minot's case the thrombocytes were reduced, but there is no record in the others. Other hæmorrhages are very rare, but I have once seen rectal hæmorrhage with bright blood in a child.

Conjunctivitis is by no means uncommon. I have seen it several times in the glandular type. In the febrile type it is more common. It appears as a dry catarrhal conjunctivitis.

Jaundice is rare, and all recorded cases have been in adults, except one child aged ten years (Glanzmann). It commonly develops after the glandular enlargement, but may precede it in the febrile type. *These cases may be otherwise normal.* The jaundice may be due to pressure of glands in the hilum or to hepatitis. Chevallier and Schmidheiny, during epidemics, saw cases with jaundice and lymphocytosis, but without any swelling of peripheral glands.

Meningeal symptoms.—Pain and spasm of the neck muscles and headache may be sufficiently severe to suggest meningitis. A case of Epstein and Dameshek's is evidence that the meninges may be involved. The cerebral symptoms were marked, and there was a typical lymphocytosis. On lumbar puncture the fluid was under high pressure, and contained numerous lymphocytes. A similar case has been published by Johansen. Both cases recovered.

Wassermann reaction.—In the 1930 epidemic the reaction was found to be positive in about half the cases tested. It usually became positive in the second week and persisted for some weeks, and then became negative. It was rarely very strongly positive. Sprunt suggests that this transient reaction is connected with the presence of heterophile antibodies.

Respiratory organs.—A slight cough is not uncommon, and may be attributed to the condition of the fauces. Bronchitis and broncho-pneumonia or pneumonia have been recorded many times. Recovery is usual but fatal terminations have occurred, and this must be regarded as a serious complication.

(To be concluded)

A NEW ANTIGEN OF B. TYPHOSUS

ITS RELATION TO VIRULENCE AND TO ACTIVE AND PASSIVE IMMUNISATION

By A. Felix, D.Sc. Vienna

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The newer knowledge of antigenic structure and antigenic variation of bacteria, accumulated during the last fifteen years, has altered very considerably the older conception of the mechanisms concerned in specific antibacterial immunity. It is now generally recognised that separate and distinct antigenic components of the bacterial cell play quite different rôles in immunity and immunity reactions.

In the case of the flagellated bacilli the important factors are the O antigens and the corresponding antibodies, while the flagellar H antigens and the antibodies that react with them are of no protective value in active and passive immunisation. Smooth-rough variation, which does not affect the flagella but is associated with partial or complete deterioration of the specific smooth O antigen, concurrently reduces and eventually annuls the immunogenic value of bacteria undergoing this type of variation. The smooth O antigen, or more particularly the so-called type-specific polysaccharide, which is its most important constituent, is also held responsible for the high virulence of smooth bacteria as contrasted with the low virulence of rough variants (for references see Topley[1]).

In a recent paper (Felix and Pitt[2]) we have shown that in the special case of *B. typhosus* virulence is intimately associated with resistance to the action of the O antibody. Inagglutinable strains are highly virulent, whereas agglutinable strains are of low virulence. Both types of strain showed the general characters of smoothness and did not differ in their content of smooth O antigen. The conclusion therefore appeared inevitable that in the case of *B. typhosus* the mere presence of smooth O antigen does not of itself determine high virulence, and that some unknown factor is required to render this antigen resistant to the action of the O antibody.

The nature of this factor at first appeared entirely obscure. Further experiments, however, revealed the surprising fact that it is itself an antigen, separate and distinct from the long-established O and H antigens of *B. typhosus*. The subject of the present paper is the demonstration of the existence of this antigen and of its immunological significance.

Four strains, representing the two extreme types described in the previous paper (Felix and Pitt[2]), were selected for the preparation of vaccines and were used for the immunisation of mice, since Grinnell[3] and Perry, Findlay, and Bensted[4] had shown that the mouse is a very suitable experimental animal for virulence and protection tests with *B. typhosus.* The vaccines were saline suspensions of 24 hour agar cultures, standardised by opacity and killed by heating for 1½ hours at 58° C. Mice weighing between 26 and 28 g. were inoculated subcutaneously at three days' interval, the first dose containing 200 × 10^6, the second 400 × 10^6 organisms. Twenty-four days later the test dose was inoculated, intraperitoneally, consisting of 2 M.L.D. (= 200 × 10^6 organisms) of our most virulent inagglutinable strain Ty 2. The technical details observed in this and the subsequent infection experiments have been described in the previous paper.[2]

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Previous experiments with inagglutinable and agglutinable smooth strains had failed to reveal any antigenic difference between the two types. Suspensions of the inagglutinable or resistant strains, when used in the living state in agglutination and absorption tests, were unable to react with the O antibody. However, when killed by heat or by treatment with various chemicals these suspensions were agglutinated by O immune serum to titre limit and quantitative absorption tests with standardised suspensions showed that sensitive and non-sensitive strains did not differ in their content of the smooth O antigen. Furthermore, in rabbit immune sera prepared by inoculation of inagglutinable strains, killed by heating at 60° C., no residual agglutinin for the homologous strain was demonstrable when the O agglutinin had been removed by absorption with an agglutinable strain. These results seemed to justify the statement made in the previous paper[2] that the two types of strain did not differ in their antigenic composition.

Although the protection experiment recorded in Table I. clearly indicated the presence in the inagglutinable strains of a separate antigen which withstood heating to 58° C., it was thought possible that this treatment might impair its agglutinogenic value and thus preclude the demonstration of the corresponding antibody by agglutination methods. Rabbits were therefore immunised with suspensions of living organisms of the two types of *B. typhosus* and control rabbits were inoculated with suspensions heated at various temperatures. The strain "Mrs. S." which had been used in earlier experiments by Ledingham[5] and Arkwright[6] was also included in the series; this strain is of the type of intermediate agglutinability and virulence and represents the most common type of *B. typhosus.*

Four intravenous inoculations were given at intervals of two days. The suspensions of living organisms and those killed by heating at 58° C. were each time freshly prepared from 24 hour agar cultures, while those heated at 70° C. and 100° C. were prepared in bulk and stored in the cold. The total number of organisms inoculated is stated in the Table. One week after the last inoculation blood was drawn from the jugular and tested against fresh saline suspensions of living organisms of the inagglutinable and agglutinable types. The technique of the agglutination tests was the same as described in the previous paper.[2]

It is seen from Table II. that the immunisation with living organisms of the three inagglutinable strains and of the intermediate strain "Mrs. S." led to the production of an antibody which was absent from the sera of the rabbits inoculated with living agglutinable organisms and also from those immunised with heated suspensions of the two most virulent and inagglutinable strains Ty 2 and Giglioli. The symbol "Vi" is used for this antibody, since it is proposed to designate the new antigen as the "Virulence antigen" and to refer to it as the "Vi" antigen.

TABLE II.—*Agglutination Test*

Rabbits immunised with strains of *B. typhosus.*				Titres of the antibodies present in the sera.		
Rabbit.	Type of strain.	Strain.	Dose in million of organisms.	H	O	Vi
	Inaggl. Virulence high.	Ty 2—				
62		Live	800	10,000	5,000	400
63		Heated 1½ hrs. at 58°	8000	20,000	20,000	0
64		„ 1 hr. „ 70°	8000	1,000	50,000	0
65		„ 1 „ „ 100°	8000	200	20,000	0
		Giglioli—				
67		Live	800	5,000	5,000	100
68		Heated 1½ hrs. at 58°	8000	10,000	20,000	0
69		„ 1 hr. „ 70°	8000	2,000	20,000	0
70		„ 1 „ „ 100°	8000	0	20,000	0
74		Watson. Live ..	800	5,000	2,000	200
75	Inter-mediate.	"Mrs. S." Live ..	800	20,000	10,000	50
71	Aggl. Virulence low.	Ty 8. Live	1600	20,000	5,000	0
72		Ty 901. Live	1600	20,000	10,000	0
73		Rawlings. Live ..	1600	5,000	20,000	0

Titre 0 = a negative result in a dilution of 1 in 20.
Aggl. = agglutinable.

The Vi antibody is capable of clumping the inagglutinable strains, whereas the O antibody is unable to produce this effect. The macroscopic appearance of the Vi agglutination is very similar to that of O agglutination; small granules of uniform size are formed, which settle slowly and leave the supernatant fluid perfectly clear. The titre of this antibody is very much lower than those of O and H antibodies, the highest Vi titre observed in the present series not exceeding a dilution 1 in 400.

All the virulent strains reacted with all the sera containing the Vi antibody, thus indicating uniformity of the antigen concerned. The intensity of the reaction showed a definite relationship to the degree of virulence. The Watson strain was most readily clumped by the Vi antibody, next followed the strain Giglioli, and then Ty 2. This is the inverse order of their relative virulence.[2] The Vi titres recorded in Table II. represent those observed with the strain Watson as test strain.

The independence of the Vi antibody of the accompanying O and H agglutinins was readily demonstrated by absorption tests. Table III. illustrates in much abridged form the results obtained in numerous experiments.

TABLE III.—*Agglutinin Absorption Test*

Type of antibody.	Titre of agglutination.						
	Rabbit serum 62 II. (versus strain Ty 2, live). 1·5 c.cm. of dilution 1 in 20 absorbed with suspensions of living organisms of strains.						Control serum unabsorbed.
	Giglioli. 40,000 mill.	Watson 40,000 mill.	Mrs. S. 80,000 mill.	Ty 1. 160,000 mill.	Ty 901. 240,000 mill.	Rawlings. 240,000 mill.	
H	1000	500	1000	0	0	0	10,000
O	2000	2000	1000	500	0	0	5,000
Vi	0	0	0	0	400	400	400
Type of strain	Inagglutinable.		Intermediate.		Agglutinable.		

Titre 0 = a negative result in a dilution of 1 in 100.

It will be observed that the titre of the Vi antibody remained entirely unaltered after the O and H agglutinins had been removed from the serum by absorption with living organisms of the highly agglutinable type of *B. typhosus*. These strains were unable to reduce the Vi titre although the serum was treated with enormous numbers of organisms. On the other hand all the inagglutinable and intermediate strains tested removed the Vi antibody readily, irrespective of whether the O and H agglutinins were simultaneously removed or reduced.

In certain experiments especially designed to decide whether there was any summation effect in the agglutinating action of the Vi and O antibodies it was found definitely that neither of them was capable of enhancing the action of the other.

It is at present a matter for speculation what exactly the mechanism is by means of which the Vi antigen renders the smooth O antigen in the living organisms resistant to the action of the O antibody. The supporters of the surface theory of antigen-antibody action undoubtedly will welcome the phenomenon as additional evidence of the correctness and general validity of the theory.

For the purposes of the present investigation the main results of the in-vitro tests are: (1) the demonstration of the existence of the Vi antigen and (2) the evidence of its presence in strains of intermediate agglutinability and virulence, which represent the most common type of *B. typhosus*.

ITS PROTECTIVE ACTION IN PASSIVE IMMUNISATION

The rabbit sera described in the previous section and other sera obtained from subsequent bleedings of the immunised rabbits were next tested for protective action against infection with the most virulent strain Ty 2. The sera were kept without the addition of any disinfectant and the sterility of each sample was ascertained prior to its being used for intramuscular inoculation into mice. One to two days after the serum injections the test dose was inoculated intraperitoneally. Table IV. gives a sample experiment.

TABLE IV.—*Passive Immunisation*

Rabbit sera injected into mice intramuscularly two days prior to test dose.					Number of mice tested by intraperitoneal inoculation of strain Ty 2 (150×10^6 organisms).	
Serum No.	Titre of antibodies present in the serum.			Dose of serum in c.cm.		
	H	O	Vi		Tested.	Survived.
62 II.	10,000	5,000	400	0·5	4	4
				0·25	4	4
				0·1	4	3
74 II.	5,000	2,000	200	1·0	4	4
				0·5	4	0
64 II.	1,000	50,000	0	1·0	4	0
72 II.	20,000	10,000	0	1·0	4	0
73 II.	5,000	20,000	0	1·0	4	0
Controls with normal mice—						
Full test dose (150×10^6 organisms)					4	0
Half the test dose (75×10^6 organisms)					4	0

The results reproduced in this Table do not call for much comment. The two sera containing Vi antibody exert a powerful protective action, whereas the three sera devoid of Vi antibody are of no protective value whatsoever. The serum No. 62 II. with the higher content of Vi antibody (titre 1 in 400) has a much higher protective power than the serum No. 74 II. with the lower content of this antibody (titre 1 in 200).

The potency of the Vi antibody in protective action appears particularly striking in view of the comparatively low titres of its in-vitro action, which are in contrast to the high titres of the O antibody. The H titres, although for the sake of completeness recorded in Table IV., need not be considered in this connexion, since it is well known that H antibodies are negligible as protective agents. The O antibody, however, whose important rôle in antibacterial immunity is firmly established, makes a curiously poor performance in this experiment, when an in-vitro titre of 1 in 50,000 finds no expression in the in-vivo action.

The Vi antibody was also tested for protective action in the absence of the O and of both the O and H antibodies. The serum No. 62 II. was by repeated and massive absorption freed from these latter antibodies, until none were demonstrable in a dilution of 1 in 20. The Vi titre remained unaltered and the absorbed sera were found as potent in protective action as was the unabsorbed serum.

Differing Rôles of the Vi and O Antibodies

The protection experiments described in previous sections were all planned with a view to testing the efficacy of active or passive immunisation by subsequent infection with a strain of extreme inagglutinability and highest virulence. To obtain a more complete picture an experiment was conducted in a different way.

Two batches of mice, each numbering fifty, were immunised by subcutaneous inoculation of vaccines prepared from strains of the two extreme types. The vaccine from the virulent strain Ty 2 was given in the same dose as in the experiment described in Table I.—i.e., 200 and 400 million organisms at two days interval; the vaccine from the avirulent strain Ty 901 was used in twice that amount, since previous experience with vaccines from this type of strain (Table I.) had shown that the smaller doses had no protective effect. Each batch of the immunised mice was then divided into four groups and these were tested, along with groups of control animals, by intraperitoneal inoculation of 2 M.L.D. of the two strains which had been used for the protective inoculations and also of two strains of intermediate agglutinability and virulence.

The result of this experiment (Table V.) appeared difficult to interpret. If the figures for the two intermediate strains are first disregarded and only those for the two extreme types Ty 2 and Ty 901 are considered, it will be seen that each vaccine protected only against infection with the homologous strain, and that in the case of the strain Ty 901 the degree of protection was not very high. The inefficiency of the vaccine from Ty 901 in protection against Ty 2 is in accord with the results shown in Table I. and is readily explained by the absence from this vaccine of Vi antigen. The failure of the vaccine from Ty 2 to protect against the strain Ty 901 is obviously due to the insufficient quantity of O antigen administered by the protective inoculations, since this vaccine has been used in half the dose of that of strain Ty 901.

TABLE V.—*Active Immunisation. Protection against Infection with different types of* B. typhosus

Test dose inoculated intraperitoneally.				Mice immunised with vaccines from strain.				Controls. Normal mice tested with			
Days after second dose of vaccine.	Strain.	Type.	Dose in million of organisms.	Ty 2. (Dose 600×10^6.)		Ty 901. (Dose 1200×10^6.)		Full test dose.		Half test dose.	
				T.	S.	T.	S.	T.	S.	T.	S.
17	Ty 2	Inagg. Virulence high.	200	12	12	12	0	12	0	10	0
20	"Mrs. S."	Intermediate	600	11	6	11	0	12	0	10	1
19	Ty 1		800	12	5	12	1	12	0	10	0
18	Ty 901	Agg. Virulence low.	1600	13	1	14	7	14	0	10	2

T. = tested ; S. = survived.

The results obtained with the animals immunised with the vaccine from Ty 901 and infected with the two intermediate strains "Mrs. S." and Ty 1 are also readily interpreted. It has been shown in Tables II. and III. that both these strains possess Vi antigen, which renders them resistant to the action of O antibodies. But the low degree of protection against the two intermediate strains displayed by the mice which had been immunised with the vaccine from strain Ty 2 was rather puzzling. It seemed paradoxical that mice from the same batch of immunised animals should be better protected against the most virulent strain Ty 2 than against the less virulent strains "Mrs. S." and Ty 1. Heterogeneity of the Vi antigen could not be suspected, since the in-vitro tests described in a previous section clearly indicated that this antigen was uniform in all the strains tested.

It will be observed that the number of organisms inoculated as the test dose varied very considerably with the four strains recorded in Table V. To keep the test dose of each strain at the constant level of 2 M.L.D. this procedure was unavoidable. However in the case of Ty 901, the strain of the lowest virulence, the test dose of 1600 million organisms very closely approached that number of bacilli which in previous experiments [2] had been found to produce lethal effects when administered as dead vaccine to mice. It seemed therefore most likely that the unsatisfactory protection against strains of lower virulence was due to the toxic effect of the large inoculum used. This hypothesis was tested in the following experiment (Table VI.).

TABLE VI.—*Neutralisation of Endotoxin*

Rabbit sera: 1 c.cm. of each serum injected into mice intramuscularly two days prior to test dose.				Mice tested by intraperitoneal inoculation of dead vaccine from strain Giglioli. ($10,000 \times 10^6$ organisms.)	
Serum No.	Titre of antibodies present in the serum.				
	H	O	Vi	Tested.	Survived.
62 III.	10,000	2,000	400	4	0
74 III.	2,000	2,000	200	4	1
67 II.	5,000	5,000	100	4	3
67 III.	5,000	2,000	100	4	1
64 II.	1,000	50,000	0	4	4
69 II.	2,000	20,000	0	4	4
72 II.	20,000	10,000	0	4	3
73 III.	5,000	10,000	0	4	2
Controls with normal mice— Full test dose ($10,000 \times 10^6$ organisms)				10	1

The rabbit sera previously used in passive protection experiments were tested for their capacity of neutralising the toxic effect of killed vaccines. The mice received 1 c.cm. of the immune sera intramuscularly and two days later the test dose of killed bacilli was inoculated intraperitoneally. Although it had been shown in the previous paper [2] that the most virulent strains are not more toxic than those of lowest virulence, it was, nevertheless, thought advisable to prepare the test vaccine from a virulent strain in order to obtain a suspension containing both the O and Vi antigens. After preliminary tests for toxicity the dose of 10,000 million organisms of the strain Giglioli, killed by heating for 2 hours at 58° C., was selected as test dose.

It is seen from Table VI. that the four immune sera which contained no demonstrable Vi antibody but had a high content of O antibody possessed a high neutralising power against the toxic effect of the vaccine. Of 16 mice given this type of serum 13 survived. In the corresponding group of 16 mice which had received immune sera rich in Vi antibody but comparatively poor in O antibody only 5 survived. The neutralising effect of the high-titre O sera was also strikingly demonstrated by the different clinical picture observed in the survivors in the two groups. The 5 survivors in the latter group all showed definite symptoms of illness during the first day following the inoculation of the test dose. On the other hand, in the group of mice protected with the high-titre O sera the great majority of the animals which survived showed no symptoms of illness whatsoever.

The result of this experiment clearly indicates that the O antibody has a definite neutralising effect on the so-called endotoxin of *B. typhosus*, whereas the Vi antibody is incapable of this action. This is in accord with the fact that virulence and toxigenicity of *B. typhosus* are independent of each other.[2] Just as the Vi antigen present in virulent strains does not cause any increase in toxicity, so the Vi antibody does not contribute towards the endotoxin-neutralising power of the serum. It is not claimed that the O antigen is the sole factor associated with the toxic action of killed bacilli; other constituents of the bacterial cell may also play a part. But it is the O antibody alone amongst the three different antibodies demonstrable in antityphoid sera that shows a definite relationship to the content of endotoxin-neutralising bodies in the serum.

The O antibody, which is known to exert bactericidal (Felix and Olitzki [15]) and opsonising effects (Braun and Nodake [16]), quite apart from the neutralising action now described, appears to be the sole antibody required in protection against the type of strain of low virulence exemplified in Table V. by the strain Ty 901. The Vi antibody per se is entirely without effect on organisms of this type, since they are devoid of Vi antigen.

Clinical Bearing

The results of the experiments presented in this paper obviously have a direct bearing on the theory and practice of antityphoid inoculation and of serum therapy of typhoid fever. Doubts will possibly be voiced as to whether the facts established in experiments with mice are also valid with regard to the disease in man. Such a view, however, does not seem to carry weight. The basic element in the pathogenesis of typhoid fever is the bacteriæmia. And there is no reason for the belief that the antibacterial defence mechanisms evolved in one animal species are not at work when another species is invaded. In this connexion the fact may well be recalled that in the case of the O and H antibodies it was clinical observation and the analysis of the serum reactions of typhoid patients that first led to the recognition of the different immunological significance of the two types of antibody (Felix [7]). This conclusion was subsequently corroborated by experiments with guinea-pigs (Arkwright [6]) and mice (Topley,[8] Schütze [9]). The Vi antigen and antibody are approached by the opposite route and the relative importance of their effect on the course of the disease in man will be assessed by the clinical pathologist. Two procedures suggest themselves: (1) investigation into the correlation between the severity of the disease and the inagglutinability (i.e., virulence) of the culture of *B. typhosus* isolated from the patient's blood; (2) investigation into the relationship between the clinical course and the appearance of Vi antibodies in the patients' blood-serum.

ANTITYPHOID INOCULATION

With regard to prophylactic inoculation the relevant result is that the Vi antigen must be taken into consideration. The importance of perfect smoothness of the cultures used for making typhoid vaccines, first established by Arkwright [6] and more recently emphasised by Grinnell [3] and Perry, Findlay, and Bensted,[4] will not be diminished as a result of the present investigation. The smooth O antigen remains an essential element in virulence and in immunogenic value. This has been clearly indicated in both the preceding [2] and the present paper. It is evident, however, that in virulence as well as in protective action the smooth O antigen of *B. typhosus* is not the sole factor concerned. It shares its place with the Vi antigen.

It cannot yet be stated exactly in what way this newer knowledge will affect the accepted methods for making typhoid vaccine. The essential properties of the Vi antigen—i.e., resistance to heat, to various chemicals, and to storage—must first be studied adequately. It is obvious, however, that to ensure maximum efficacy of the vaccine the strain or strains selected must have the highest possible content of Vi antigen, in addition to the normal quota of O antigen. In this connexion it is necessary again to emphasise the two facts—namely, that the degree of agglutinability, which reflects the absence or presence of Vi antigen, is a remarkably constant property of different strains of *B. typhosus*; and that the Rawlings strain, which is so widely being used for the preparation of typhoid vaccine, belongs to the sensitive type which is devoid of Vi antigen (Felix [10]). By some curious coincidence it happened that two of the three strains used by Arkwright [6] in his protection experiments, the strains Ty 901 and Rawlings, were of the latter type, while no strain of the inagglutinable and highly virulent type was included in his series.

The possession or lack of Vi antigen, though remarkably constant in strains of *B. typhosus* when maintained under standard conditions, are by no means properties incapable of variation. Perry, Findlay, and Bensted [11] recently accomplished the transformation of the avirulent Rawlings strain into one of high virulence by passage through the mouse, and the present writers observed variations in agglutinability and virulence under varying conditions of growth. The consistent search by Perry, Findlay, and Bensted [12] for a method of increasing the protective value of typhoid vaccine by increasing the virulence of the strain used is undoubtedly an attempt in the right direction. The theoretical basis of this procedure is the high protective value of Vi antigen, demonstrated in the present communication.

It has not yet been investigated whether the facts established in experiments with *B. typhosus* are applicable also to *B. paratyphosus* A and B and more generally to other bacteria which also do not produce the typical exotoxin. Reference should, however, be made to a paper recently published by Day [13] who described "species immunity to virulent streptococci," due to a special antigen which is related to virulence and is common to both hæmolytic and non-hæmolytic streptococci.

SERUM THERAPY OF TYPHOID FEVER

The value of antityphoid sera in the treatment of typhoid fever has been and still is a matter of controversy (see Petrie [14]). The view was even held that through their lytic action on the bacteria such sera might be harmful to the patient, since the endotoxin is suddenly liberated without being neutralised.

The potency of the Vi antibody in protective action against infection with the highly virulent type of *B. typhosus* (Table IV.) and the definite neutralising effect of the O antibody on the so-called endotoxin (Table VI.) seem to justify the expectation that a serum containing both these antibodies will prove to be of value in the treatment of typhoid patients. It has been shown in this paper that the reactions between the two kinds of antigen and antibody take their course independently of each other and that there is no summation of the effect of the two reactions. The therapeutic serum should, therefore, contain effective amounts of each of the two antibodies, which are amenable to quantitative estimation by both in-vivo and in-vitro methods.

Horses are now being immunised at the serum department of the Lister Institute and it is hoped that a supply of the serum will shortly be available for experimental and clinical trial.

Summary

The factor present in virulent strains of *B. typhosus* and responsible for their virulence and inagglutinability is an antigen.

This antigen is separate and distinct from the O and H antigens of *B. typhosus* and renders the O antigen resistant to the action of the O antibody.

The symbol Vi (referring to virulence) is suggested for this antigen and the corresponding antibody.

The Vi antibody is demonstrable by agglutination and absorption tests; its in-vitro titre is comparatively low.

Active and passive immunisation disclose the powerful protective action of the Vi antibody.

The O antibody, which is known to exert bactericidal and opsonising effects, also neutralises the endotoxin of *B. typhosus*, whereas the Vi and H antibodies are incapable of this action.

The bearing of these facts on the theory and practice of antityphoid inoculation and of the serum therapy of typhoid fever is discussed.

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THE ADMINISTRATION OF PARALDEHYDE BY THE RECTUM

AS A PRELIMINARY TO GENERAL ANÆSTHESIA

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So widespread is the dread of anæsthesia induced by what are still the ordinary methods that it is almost a commonplace to hear a patient protest before operation that it is not the actual operation that he or she fears but the anæsthetic. Latterly, through the more general use of basal narcotics, much has been done all over the world to eliminate this dread, and the purpose of this paper is to record briefly the results of an extended trial of one such narcotic at St. Andrew's Hospital.

Out of the many drugs at our disposal we looked for one which was easy to administer, was comparatively non-toxic and, at the same time, constant in *its action*; paraldehyde seemed to fulfil these conditions best. Paraldehyde $(CH_3CHO)_3$, an ethane[1] derivative, is a product of the polymerisation of acetaldehyde (CH_3CHO), and it is classed with avertin (tri-brom. ethyl alcohol CBr_3CH_2OH) and chloral $(CCl_3CH(OH)_2)$ as an hypnotic. It is a *colourless* liquid, soluble in water to the extent of 1 in 10, more soluble in ether, and said to have an unpleasant ethereal odour, though this latter property has not proved a disadvantage in practice, either to the patient or his attendants. Though it acts by depressing the cerebral cortex, there appears to be a safe margin between hypnosis and medullary depression. It is excreted mainly by the lungs and kidneys. Death is caused by respiratory failure. A case is recorded where as much as two ounces were given by the mouth and only prolonged sleep resulted. It was recommended by Cervello as long ago as 1883. Its pharmacological antidotes[2] are picrotoxin, coriamyrtine, and camphor—stimulants to the cerebral cortex.

Our procedure is as follows:—

The patient is prepared for operation in the ordinary way. When considered unnecessary the enema is omitted. (In our early cases it was thought that there was a tendency on the part of the patient to return the paraldehyde solution when an enema had been given previously. This may have been due to the solution itself, which has since been modified slightly.) Rectal irritation, when present, may be allayed by a chloretone suppository (grs. 10), though only in exceptional cases is one required. Our rule is to give one drachm per stone of the patient's body-weight in twelve ounces of saline. It appears, however, that patients with blood pressures on the low side require proportionately lower dosages. To overcome the burning sensation complained of in some cases gum acacia has been added to prevent the tendency of the drug to come out of solution and irritate the mucous membrane of the rectum. Four grains of the powdered gum acacia are added for every ounce of saline used.

The solution, at body temperature, is given by the rectum 1½ to 2 hours before operation, very slowly by funnel and catheter, with the patient lying on the left side and the buttocks slightly raised. During the administration, which occupies 30 to 40 minutes, the ward is kept as quiet as possible. The patient comes under the influence of the drug in about 25 to 45 minutes, sleeping quietly and quite unconscious of his surroundings. In this condition he is transported to the theatre. Induction is accompanied by very little excitement, except for occasional talkativeness. The rate of induction and depth of narcosis resulting from a given dose of the drug vary slightly in different patients, and so it is as well to begin inducing early to be on the safe side. If anything, the condition of the patient is all the better for his being kept a short time in the ward before proceeding to the theatre. During this time he should be kept under observation, though no respiratory or other difficulties are to be expected; he lies quietly on his left side, the limb reflexes are lost and the corneal reflex depressed; the cough reflex is still present; the pupils are contracted. Several patients can be treated together by the ward staff, ready to proceed in their turn to the operating theatre. An injection of atropine is usually given half an hour before operation.

The blood pressure taken before the administration of the drug and again in the theatre showed an average fall of systolic pressure of 22 mm. (varying from 0–50 mm.) and an average fall of pulse pressure of 9 mm. (varying from 0–20 mm.). The pulse-rate is not perceptibly altered. It has been our practice to continue anæsthesia with gas-and-oxygen and, if necessary, a minimal amount of ether in addition. This latter may be required for the skin incision, the peritoneal incision, or during dragging on the mesentery for any reason, though a surprisingly small amount is required for full surgical anæsthesia. It is at these moments that the coöperation of the anæsthetist is so important to ensure success. When relaxation has been obtained ether can usually be discontinued. De-etherisation can be brought about at the end of the operation by the use of 5 or 10 per cent. carbon dioxide oxygen inhalations. The absence of bronchial secretion makes the response to inhalation methods all the more delicate, and the breathing is devoid of that mucous rattle which is frequently heard when inhalation methods alone (especially ether) are employed. The colour of the patient is sometimes sallow after the paraldehyde has been given, but quickly improves when gas-and-oxygen is administered, and then usually remains good throughout the operation. On return to the ward the patient recovers consciousness in one-half to two hours, depending on the amount of additional anæsthetic used at operation, though drowsiness may continue for 6 to 14 hours.

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During unconsciousness the relaxed jaw and tongue require watching, and Hewitt's airway or swabbing of the pharynx is useful in cases likely to suffer respiratory difficulty, but no more than ordinary care is demanded in most cases. The patient, once roused, can be put in Fowler's position or on the left side, and is then allowed to go off to sleep again—which he generally does. A rectal washout on return from the theatre is not necessary. *Post-operative morphia may be dispensed with in* some cases. Post-anæsthetic vomiting is slight or absent. *Hiccough sometimes occurs, but is well controlled by the* inhalation of 5 or 10 per cent. carbon dioxide, and is of no serious consequence.

To avoid any tendency to atelectasis it has been our practice to give 5 per cent. carbon dioxide in oxygen as an inhalation for a short while every four hours for the first day. On the day after the operation there is diminished sensibility to pain and less restlessness, factors which *favour post-operative healing.*

It is our opinion that post-operative pulmonary complications — e.g., bronchitis and bronchopneumonia—are more frequently absent and, when they occur, less severe than when ordinary inhalation methods are used, although it is not easy to obtain figures to substantiate this. It might be argued that the shallow breathing would predispose to these difficulties, but even without the excessive use of carbon dioxide inhalation this has not, in our experience, proved to be the case.

In all, 200 *consecutive* surgical cases have been anæsthetised by this method. In this series there were nine deaths, but these could in no way be attributed to the anæsthetic. The advantages of the method are obvious. The excitement of an operation and the mental strain of the events which lead up to it *are removed ; the patient goes to sleep in bed, not* realising in many cases that the operation has taken place and the ordeal is over, and convalescence is in consequence easier and less disturbed. From the nursing point of view, the time lost before operation is more than compensated by a quicker convalescence. There is also a definite saving of time in the anæsthetic room between operations. *The drug itself is consistent* in its action and requires no complicated technique for its administration. *It has no depressing effect* on the heart. Children take proportionate doses well, the aged and very toxic patients not so well; in the latter there is *a tendency* for the paraldehyde solution not to be well tolerated. In cases of colitis and ulceration of the rectum the drug is definitely contraindicated. Its use is obviously less practical in surgical emergencies. In cases where, for some reason or other, it was possible to give only a small dose, no harm was done and anæsthesia was *induced by* the ordinary methods. In one case of severe jaundice, with marked hepatic insufficiency, the drug was given with no harmful effect. In operations about the head and neck freer surgical access is possible, and *in gynæcological operations (especially for perineal* repairs) healing is favoured by the post-operative calm.

I have been fortunate, in my endeavour to give this method a trial, to be associated with Mr. J. M. Milloy, Dr. Joyce Morgan, and Dr. Catherine Lendrum, who have afforded me every assistance. To our two surgical sisters, Sister Jane Lynn and Sister Jessie McGregor, without whose coöperation success could not be attained, I am greatly indebted for the painstaking care with which they have tended the patients in the wards. *In this short series we have all (patients, medical and nursing staff alike) been much impressed with the advantages of the use of this drug, so much* so that it seems likely to establish itself as a routine method of induction for all ordinary surgical cases in the hospital.

INTESTINAL OBSTRUCTION CAUSED BY IMPACTED GALL-STONE

DIAGNOSIS BEFORE OPERATION

By Eugene Rosenthal, M.D.

LECTURER IN THE ROYAL UNIVERSITY, BUDAPEST, HUNGARY

Intestinal obstruction caused by gall-stones is rare. Adams and Cassidy[1] found it in 6 cases only out of 500 operated on for intestinal obstruction in St. Thomas's Hospital during a period of twenty years. Because the condition is so rare and because the symptoms *require urgent surgical intervention,* the patient is usually operated on before the cause of *the ileus is diagnosed. This may account for the* fact that gall-stone obstruction is usually only diagnosed at operation. In a recent case under my care it was possible to make an exact diagnosis beforehand.

A woman, aged 45, was seized with severe colicky pains in the middle of the lower abdomen, which lasted for about an hour. On the next evening the pain reappeared and was more violent, and she vomited. The *pain was so bad that she was given a hypodermic injection* by her family doctor. As he had found diabetes eight weeks previously he also gave her a dose of insulin. On the next day she had a good deal of meteorism but passed very little gas, and repeated enemas only yielded a small quantity of brownish fluid. The third and fourth days of her illness were chiefly characterised by bilious vomiting. The temperature throughout was normal.

I saw her on the fourth day. She did not give the impression of being seriously ill; her colour was fresh, her tongue moist, and she gave a calm and comprehensive account of herself. No abnormality of the chest organs was found except an elevated but freely moving diaphragm. The abdomen was markedly distended and the umbilicus retracted. There was no abnormal dullness in the lower *parts of the abdomen and the liver dullness was normal.* Nor was there any tenderness or muscular contraction. Nevertheless the pulse-rate was about 120 with a normal temperature, so that the diagnosis of small intestine obstruction was hardly in doubt. Suspicion of gall-stones arose on account of the diabetes, and after repeated inquiries the patient admitted that she had had gastric trouble four years previously for which a cholecystography *had been performed by the intravenous method* but the gall-bladder had not been seen.

A radiogram showed dilated intestinal loops (Fig. 1) which located the obstruction in the small intestine. A

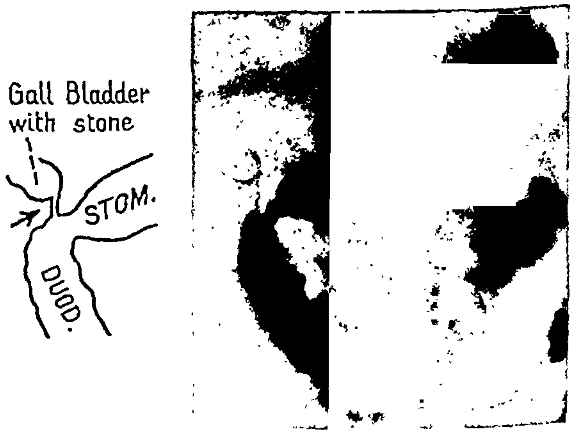

FIG. 2.—Radiogram showing the communication between gall-bladder and duodenum.

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[1] Adams, T. E., and Cassidy, M. A.: Acute Abdominal Diseases, London. 1913, p. 146.

arium meal was then ad- ninistered and was shown to ass through a canal, 3 cm. ong and only a few milli- netres wide, running upwards nd outwards from the upper art of the duodenal bulb and nding in a somewhat larger rgan (Fig. 2) which seemed o be the gall-bladder. The arium also showed the di- ated intestinal loops. This bnormal passage appeared o be the canal through which he stone had passed and, lespite the absence of gastric nd gall-bladder pain, the liagnosis of perforation of a all-stone into the duodenum vas confidently made. The violent pains in the first days of the illness had been caused by impaction of the stone in the lower loops of the ileum (Fig. 3). Dr. D. Klimkò operated and found a gall-stone the size of a walnut (5 by 3 cm.) in the lower part of the ileum. The intestine was dilated above it and collapsed below it. There was peritonitis from which the patient died two days later. At autopsy a second stone was found in the gall-bladder and, buried in adhesions, the canal through which the first stone had passed into the duodenum.

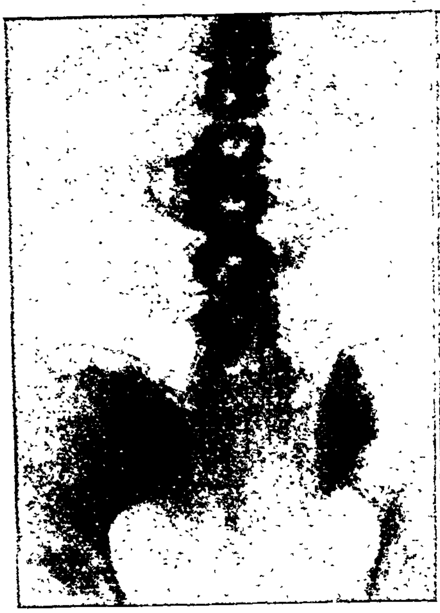

FIG. 1.—Dilating loops of the small intestine.

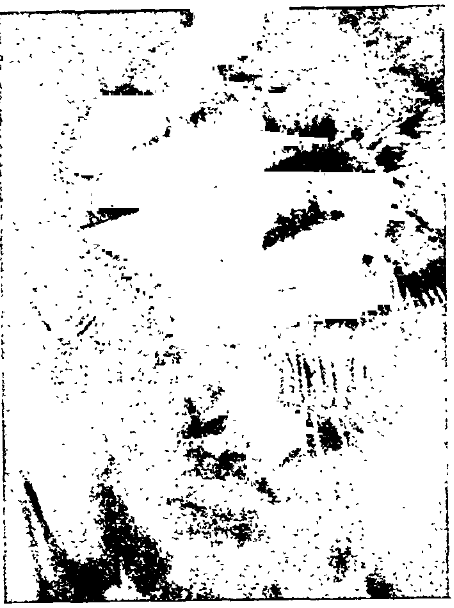

FIG. 3.—Showing the stoppage at the lower loops of the ileum.

The two facts which emerge from this case are: (1) a comparatively large stone may penetrate into the duodenum without causing pain; (2) pre-operative examination revealed the exact diagnosis and demonstrated the importance of carrying out the plan of examination suggested by me some years ago.²

STONE IN THE LOWER URINARY TRACT IN INDIA

EXAMPLES OF MULTIPLE CALCULI

By Rufus C. Thomas, F.R.C.S. Edin.

CHIEF MEDICAL OFFICER TO HIS LATE HIGHNESS THE MAHARAJAH JAMSAHEB OF NAWANAGAR

India may be looked upon as the home of urinary calculi. Stone is one of the commonest conditions with which a surgeon is called upon to deal. The following notes are prompted by an experience over a period of six years in a part of India where stone was very prevalent. The number dealt with in that time was about 250.

By far the greater number occurred in males above the age of 8 years. It was, however, quite a common thing to operate on much younger children. The youngest child I operated upon was 6 months old and had a stone the size of a hazel-nut. It must have taken several months to reach that size. I believe children of much smaller age have been dealt with by others. The proportion of females was small, and those operated upon were chiefly below the age of puberty. The reason for this is obviously the ease with which small stones can be passed through the female urethra. Two or three cases of stone in the prolapsed bladder in subjects of procidentia occurred, the stones being removed through the anterior vaginal wall. In one old lady a large stone was removed per urethram, after dilatation with Hegar's dilators. A good many stones impacted in the male urethra were dealt with, the greater number being held up at the commencement of the penile urethra. A small number of prostatic stones were met.

The commonest stone was the hard, smooth, oval urate, of which two were often found, and sometimes three. Next came the phosphatic. Both these types were often very large. The mulberry calculus was always small, on account of the pain and vesical irritability it caused, so that the patient early sought advice. Hæmaturia and pain at the end of micturition was the usual complaint in mulberry calculus. The other patients complained more of frequency, sudden cessation of the urinary flow, and a feeling of heaviness in the bladder or perineum. Pain only became a predominant symptom when cystitis was present, or a stone became impacted in the prostatic urethra.

A very striking thing about most of the cases was the long time over which symptoms were endured before advice was sought. Some of the adults, judging by the size of their stones, must have been suffering for years. This is also borne out by the multiplicity of stones in some cases. Several cases of long standing had to have a bladder drainage on account of the pronounced degree of cystitis. In one instance, the bladder was found to be so sloughy that it was impossible to stitch it up, each stitch cutting out as soon as inserted.

This was a Hindu about 30 years of age. He had three very large stones, and was in great pain on admission. He was running a high temperature, and was so ill that I was for a day or two doubtful whether he would stand an anæsthetic, and gave him morphia for two days to give him some sleep. I removed the stones on the third day, leaving a suprapubic tube in to drain the bladder. In spite of this he died about eight days later of septicæmia. This was the only fatality out of the total number of cases, and was not to be wondered at, in view of his bad condition.

TREATMENT

I removed every stone by the suprapubic route except those in the prolapsed bladder and the impacted

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[2] Rosenthal, E.: Monats. Ungar. Med., 1930, iv., 59.

urethral stones. Many of the stones were very large, and therefore not suitable for lithotrity. Many patients had two and even three stones, and lithotrity would have been a very long operation. Cystitis was quite common. Lastly, and no doubt this reason weighed very largely with me, the removal of a stone or stones by the suprapubic route never took more than 20 minutes, and was often completed in ten minutes, thus saving valuable time. And there appeared to be no more risk. It had the added advantage of permitting direct inspection of the bladder wall. The average time spent by the patient in hospital was about 15 days. Most of the patients were cultivators, who came in in the slack season when there was very little work to be done in the fields, and a fortnight meant nothing to them. Time is of very little account in India. All cases were put on to a mixture of hexamine and acid sodium phosphate, grs. 10 each, for three days, and their stones removed on the fourth day.

The operative technique consisted of the usual subumbilical incision and separation of the recti and pyramidalis, which were retracted by an assistant. The peritoneum was then wiped upwards off the bladder, which was opened below it. After removal of the calculus the bladder was swabbed dry, then closed by a running suture of No. 0 catgut from above downwards, taking mucous membrane and muscle together. This suture, after knotting below, was brought up again as an invaginating suture and tied with the original end. Fascia was closed with No. 1 catgut in children and No. 2 catgut in adults. The skin was closed with Michel's clips. A catheter was passed and strapped in in the usual way and retained for nine to ten days. A few cases developed a leak through the incision, due, I am sure, to removal of the catheter a day or so too early. This cleared up in a short time after replacing the catheter.

The following cases are quoted, as they all have some points of interest, and serve to show the length of time during which the Indian patient will put up with much discomfort before seeking advice.

CASE 1.—This must be, I think, something of a record. An old man was admitted with some pain on micturition and slight pain in the lower abdomen. Palpation revealed a mass in the subumbilical region, tender on pressure. A sound could only be passed into the bladder with difficulty. Radioscopy showed a hazy, ill-defined shadow. On opening the bladder it was found to be absolutely full of small stones, the largest not being bigger than a small nut, and the greater number being the size of a small pea or less. The opening in the bladder was enlarged and the stones removed by the aid of a spoon. There were found to be 635 stones of all sizes. The bladder was entirely filled with them, and there could have been very little room for urine. How many years the old man had taken to accumulate such a vast quantity can only be left to the imagination. The bladder was closed in the usual way, and recovery was uneventful.

CASE 2.—A Hindu, complaining of great pain and difficulty in passing urine, showed marked priapism, and a sound could not be passed, being held up in the prostatic urethra. Radioscopy showed five large stones all lumped together. On opening the bladder two large stones were removed. The prostate was found to be very much enlarged, and on pushing the finger into the prostatic urethra a mass of stones was found to be impacted in it. All efforts to dislodge one of them with the finger failed, so an incision was made forward through the prostatic tissue, and three very large stones evacuated. They must have been present for many years. The cavity left in the prostate after their removal was big enough to put a small orange into. Why the man should have delayed so long before seeking advice is a mystery.

CASE 3.—A Hindu came complaining of frequency of micturition. The passage of a sound revealed a stone in the bladder. I had made it a rule to radiograph the whole urinary tract in all cases of stone, and this patient was found to have a stone in the right ureter, about four inches above the bladder. This stone appeared to be about the size of a small hazel-nut. The stone in the bladder was removed first and the bladder closed in the usual way. The peritoneum was then pushed off the right pelvic wall and the ureter exposed. In its course was found an indurated mass the size of a walnut at the level of the pelvic brim. The mass was not fixed, but could be raised slightly by the fingers. It was incised and a pear-shaped stone removed. The opening in the ureter was stitched over, a small tube placed in position through a stab-wound in the loin, and the abdominal incision closed. The tube was left in for 48 hours, but there was no drainage from it, and on its removal the wound closed without any trouble. The patient left hospital three weeks later quite well. This patient gave no history of renal or ureteric pain, nor was there in his history anything to lead one to suspect ureteric calculus. Had it not been for the routine radiography of the upper urinary tract the stone would have been missed altogether.

The above cases will serve to show that stone in the bladder may not be quite so simple as it sounds, and that a radiogram of the upper urinary tract is worth making in all cases. The temptation to be satisfied with the discovery of a bladder stone by the aid of a sound is very great, and one is apt to forget that further trouble may be lurking, unsuspected, in the higher regions.

ENTEROGENOUS CYST OF THE ILEUM IN AN INFANT

By A. L. D'ABREU, M.B. Birm., F.R.C.S. Eng.

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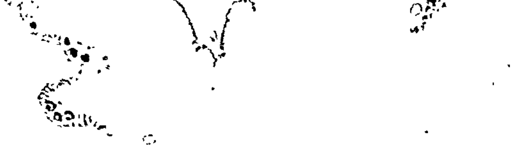
CYSTS lined by intestinal epithelium wherever found in the abdomen must be derived from gut (Evans[1]). They are now described as developmental enterogenous cysts. Their congenital origin is indicated by the valuable work of Lewis and Thyng,[2] who found that diverticula of the small intestine of the pig embryo occurred with remarkable constancy and arose from the canalisation of solid bud-like outgrowths from the bowel. Most of these completely disappear. Rarely they persist as congenital diverticula or become



The epithelial-lined cyst encircled by smooth muscle and not in communication with the bowel lumen. The intraluminary projection of the mass is covered by normal mucous membrane.

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[1] Evans, A.: Brit. Jour. Surg., 1929, xvii., 37.

[2] Lewis, F. T., and Thyng, F. W.: Amer. Jour. Anat. 1907, vii., 505.

sequestrated from the bowel lumen to form cysts which may be submucous, intermuscular, subperitoneal, intramesenteric, or omental in position. These two observers noted the same process occurring in the rabbit and in the human embryo: with the exception of cæcal enterocystomata this developmental curiosity is not met with in the large bowel.

A male child of 3½ months was admitted to the Cardiff Royal Infirmary on Jan. 11th, 1934. On the previous day vomiting had occurred and there had been no action of the bowels. On the day of admission the child constantly cried out in pain and passed blood and slime from the rectum. A history of constipation since birth was elicited. On examination the child was feeble, pale, and wasted. Temperature 98·4° F., and pulse 132. A hard oval lump could be felt in the right iliac fossa; blood and mucus were present in the rectum on digital examination. With such findings a diagnosis of intussusception was made.

Under general anæsthesia, through a right paramedian incision, a tumour was felt projecting into the lumen of the ileum three inches from the ileocæcal valve, and quite occluding the gut; proximal to this the small intestine was distended. By a longitudinal incision into the bowel a circular tumour covered by mucous membrane was excised together with a portion of the gut from which it arose; the incisions were closed in two layers. After progressing satisfactorily for two days the child collapsed and died. At the post-mortem no obvious cause of death was found; apart from hypertrophy of the bowel above the area where the tumour had been, no other abnormality was found in the abdomen.

The accompanying Figure represents the tumour after section. In the centre of whorls of smooth muscle lay a cyst containing yellow glairy fluid and seen on microscopical examination to be lined in places by typical intestinal epithelium. Part of the wall was denuded of epithelium, due perhaps to atrophy caused by intracystic pressure.

The case is one of intermuscular enterogenous cyst causing intestinal obstruction in an infant and simulating very closely intussusception.

I am grateful to Prof. A. W. Sheen, director of the surgical unit of the Welsh National School of Medicine, for permission to publish this record.

REVIEWS AND NOTICES OF BOOKS

Diseases of the Chest

And the Principles of Physical Diagnosis. Fifth edition. By GEORGE WILLIAM NORRIS, A.B., M.D., formerly Professor of Clinical Medicine in the University of Pennsylvania; and HENRY R. M. LANDIS, A.B., M.D., Sc.D., Professor of Clinical Medicine in the University. With a chapter on the Transmission of Sounds through the Chest, by CHARLES M. MONTGOMERY, M.D., formerly Physician to the Phipps Institute, Philadelphia; and a chapter on the Electrocardiograph in Heart Disease, by EDWARD B. KRUMBHAAR, Ph.D., M.D., Professor of Pathology, University of Pennsylvania, School of Medicine. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 997. 50*s*.

THIS exhaustive treatise on the physical diagnosis of the heart and lungs in health and disease holds a high place in the esteem of student and practitioner. Though intended primarily for the American student, the work requires no introduction anywhere among English-speaking peoples. The fifth edition reproduces the essential features of former ones, but many sections have been revised and new material has been added; for example, an account of the use of the bronchoscope in the diagnosis of disease of the bronchi and lungs.

The authors rightly insist that the facilities now available for specialised and laboratory methods of diagnosis should not be made an excuse for neglecting well-established physical methods. But radiology, a science unknown when the classical methods of physical examination were devised, has shown their limitations and provided for many types of disease a far more accurate means of determining the condition of structures within the thorax. It is a mistake to lead the student to expect to obtain more information from the results of auscultation and percussion than these somewhat crude expedients can provide. For example, it is difficult to believe that the most skilful percussion would indicate the shape of the heart as it is revealed by radiological examination in the various conditions of valvular disease (p. 242). The over-elaboration of percussion leads to waste of time, disappointment, and consequent depression, and withdraws attention from a more valuable general consideration of the patient's condition.

The number and excellence of the illustrations is praiseworthy. The photographs of diseased organs in situ are especially good. The lights and shades are so well reproduced that by merely looking at a plate through a roll of paper an almost stereoscopic view of the parts is obtained, and the practitioner who lacks time to study the text could learn much from a careful examination of the illustrations alone.

Atlas of External Diseases of the Eye

By HUMPHREY NEAME, F.R.C.S., Hon. Ophthalmic Surgeon, Royal London Ophthalmic Hospital. London: J. and A. Churchill. 1934. Pp. 110. 15*s*.

THESE 51 coloured plates are all well drawn and give excellent pictures of the conditions depicted. Several are from the author's own patients and have been previously published in the "Handbook" which he wrote in conjunction with Mr. Williamson-Noble. They represent typical examples of common conditions with a few uncommon ones—e.g., a remarkable case of congenital cavernous angioma of the sclerotic. All the drawings were made in the drawing department of Messrs. Theodore Hamblin. Each is accompanied by a short summary of the disease illustrated with the usual treatment.

Introduction to Study of the Nervous System

Second edition. By E. E. HEWER, D.Sc., and G. M. SANDES, F.R.C.S., M.B. London: William Heinemann, Ltd. Pp. 147. 21*s*.

THIS book, whose first edition was favourably reviewed in these columns, serves as an introduction, for the purposes of the student, to nervous anatomy and physiology. The former is treated by descriptive methods bearing chiefly on nerve-cells and tracts, and is illustrated by a large number of unusually simple and clear diagrams, most of them coloured. A few pages are also assigned to the experimental pathology of the neurone, and to the normal histology of neural and interstitial tissue. The neurophysiology is mainly of the applied order, though not exclusively; the normal paths of motion and sensation, and of the special senses, are concisely described, and the results of functional interference briefly set forth. Reflex action, conditioned reflexes, motor coördination, and the functions of the autonomic system form the subjects of other chapters. As is remarked at the outset, the authors have sought to avoid unconfirmed and controversial statements, with consequent gain to the student. The value of the work is enhanced by a series of tables giving, for instance, the constitution of the cranial nerves, the afferent and efferent sympathetic supply of different organs and tissues, the contrasted effects of upper and lower motor neurone lesions. The least satisfying part of the book comes at the end, with the heading of Notes on Certain Pathological Conditions. For some reason not immediately apparent the choice has fallen on the curious medley of hemisection of the cord, complete section of the cord, aphasia, and nystagmus. To the last of these eight lines only are allotted.

A Text-book of Gynæcology

For Students and Practitioners. Third edition. By JAMES YOUNG, D.S.O., M.D., F.R.C.S.E., F.C.O.G., Gynæcologist, Royal Infirmary; Physician, Royal Maternity and Simpson Memorial Hospital, Edinburgh. London: A. and C. Black, Ltd. Pp. 411. 16*s.*

THIS book is primarily intended for the student, and will be found to cover the ground adequately. Dr. Young has not wasted space on detailed descriptions of the technique of operations, such as hysterectomy, but gives sufficient detail to enable the student to understand what is being done. The work has been thoroughly revised, and new chapters have been introduced describing the recent advances in our knowledge of the hormones of the ovary and the anterior pituitary gland, and giving an excellent account of the functions of the hormones as at present understood. The chapters on dysmenorrhœa, amenorrhœa, and uterine hæmorrhage have also been rewritten. A new chapter of special interest is that on pain in gynæcology. It will be of great use to the practitioner in the diagnosis of the origin of pelvic pain. A slight error has crept into the section on vaginitis, where 2½ per cent. picric acid in water is recommended for treatment. Picric acid is soluble in water to the extent of only 1 part in 90.

The book gives throughout a well-balanced account of pathology, diagnosis, and treatment, and is illustrated by a number of clear drawings and photographs.

A Handbook of Filterable Viruses

By R. W. FAIRBROTHER, M.D., M.R.C.P., Lecturer in Bacteriology and Assistant Director of the Public Health Laboratory, Manchester University. London: William Heinemann, Ltd. 1934. Pp. 204. 7*s.* 6*d.*

Dr. Fairbrother's small volume is welcome, for the need of a reliable introduction to this important subject has been felt. It is clearly written, free from all unnecessary detail, and the many points of controversy are presented in an unbiased manner. The first half of the book is devoted to questions of a general nature, cultivation and microscopy, epidemiology, immunity, and the nature of filterable viruses. Then comes the description of the individual viruses causing disease in man grouped as accepted, probable, and possible virus diseases. No other classification is attempted; a wise precaution. In view of Mervyn Gordon's work one might ask why it is that lymphadenoma is not mentioned along with the other "possibles"; and lymphogranulomatosis inguinale is surely worthy of inclusion. One or two statements are open to question. The assertion, for instance, that there is every indication that the viruses are a very heterogeneous group is hardly warranted, and the same applied to the statement that the inoculation of a single large dose in a susceptible animal is the severest test for the presence of living virus. However, these are minor points which do not seriously detract from a book which we commend to the notice of students of medicine, both undergraduate and postgraduate.

An Introduction to Practical Bacteriology

A Guide to Bacteriological Laboratory Work. Fourth edition. By T. J. MACKIE, M.D., D.P.H., Professor of Bacteriology, University of Edinburgh; and J. E. MCCARTNEY, M.D., D.Sc., Director of Research and Pathological Services, London County Council. Edinburgh: E. and S. Livingstone. 1934. Pp. 504. 12*s.* 6*d.*

THIS excellent little book has been enlarged and amplified but has not yet reached clumsy proportions. As an introduction to practical bacteriology it has few rivals. The technical methods described are of the best and the accounts of them are extremely clear. The description of various organisms, including protozoa and filtrable viruses, though highly compressed, are excellent and will fulfil all the needs of the elementary student if he has pursued his practical work seriously. We trust that the authors will not be tempted to make any further additions, since a book of this sort can easily be spoilt if it grows too big.

Spinal Anæsthesia

By GEORGE RUDOLPH VEHRS, M.D. London: Henry Kimpton. 1934. Pp. 269. 21*s.*

IN this book the author attempts to present a comprehensive account of spinal anæsthesia with novocain. In the early chapters we find descriptions of the anatomy and physiology of the subarachnoid system of spaces and circulation, and consideration of the chemistry and pharmacology of anæsthetic agents in addition to the description of ordinary anæsthetic technique. A number of experiments have been made on dogs, novocain being injected into the cisterna magna; and the conclusion arrived at was that the apparent immunity of the great bulbar centres when not too large a dose is thus administered is due to dilution of the anæsthetic drug by the large volume of cerebro-spinal fluid in this situation. Dr. Vehrs is an enthusiastic advocate of spinal anæsthesia and sometimes is not very judicious in his statements; for example: "it is agreed that spinal analgesia is, in proper hands, safer than other types of anæsthesia" . . . "a discussion of an over lowering mortality-rate is not of material value except to recommend the procedure." He offers interesting hints on technique, among which are the advocacy of lateral spinal puncture and the maintenance of the spinal canal exactly horizontal by keeping the patient on his side for some minutes after injection to fix the novocain in the nervous tissue. Spread of the drug in the canal is held to be due to gravity diffusion alone, no other factors being considered at all. Dr. Vehrs believes it is possible to produce sensory nerve-block at will without any motor paralysis, and he describes a technique designed to this end; the insistence on the need for personal skill and experience of the operator is too great to be altogether convincing. The technique of a simple technical procedure of this sort should be easy to acquire, and its success should be assured.

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

PROCEEDINGS OF THE REPRESENTATIVE BODY

THE first business with which the Representative Meeting of the British Medical Association is concerned year by year is a formal motion from the chair "that the return of election of representatives of constituencies . . . be received." This year murmurs of "agreed" were interrupted by excited cries of "No, no," while Dr. St. G. B. DELISLE GRAY (Brighton), leaping to the platform, drew attention to the sad case of Dr. R. A. Wilson of Guernsey. It appeared that Dr. Wilson, the hon. secretary of the local division, had for many years represented Guernsey, but that since the amalgamation last year into one division of Guernsey, Alderney, and Jersey, the other two Channel Islands had a voice in the election. The voice of Jersey had been raised in protest against Dr. Wilson, but no other nomination had been made in his stead, and Dr. Wilson stood, a Peri at the gate, awaiting a ruling. It took the best part of an hour to sort out the issues raised by this embarrassing contretemps, for while the sympathy of the meeting was clearly with Dr. Wilson, after his long journey to be with them, it was equally clear that representatives must be elected by the whole of a constituency and not at the discretion of the meeting. An amendment authorising Dr. Wilson to be present without the right to speak or vote was carried, and in the course of the day he was restored to full potency by a telegram from Jersey, in response to a final appeal, accepting him as a "temporary" representative.

Another point of procedure was involved in a motion by Brighton, supported by Kensington and Cambridge, and carried by a substantial majority, that spontaneous motions by divisions and branches which did not arise out of the Council's report should be taken early on the morning of the last day of the meeting, instead of being left to the end and hurriedly disposed of.

The chairman, Dr. E. K. LE FLEMING, whose appeal for support in expediting business had so far met with a poor response, then managed to get through a useful batch of motions with little delay. Dr. S. WATSON SMITH, hon. physician to the Royal Victoria and West Hants Hospital, was elected president of the Association for 1934–35—Mr. F. W. RAMSAY having been unable to serve by reason of ill-health——and Sir RICHARD STAWELL of Melbourne for 1935–36.

Research Scholarships and Grants

In connexion with the finance of the Association, Sir EWEN MACLEAN proposed and Sir CRISP ENGLISH seconded a motion that the Council should consider the desirability of increasing the amount allocated to research scholarships and grants. The criticism that the Association was concerned mainly with the cash basis of the profession was known by all present to be without foundation, but though much was spent indirectly not more than £1000 was directly allocated to research, and a more generous policy in this respect would be desirable. Mr. BISHOP HARMAN, as hon. treasurer, pointed out the enormous indirect contribution to medical science made by the Association, notably in B.M.A. lectures, in reports of ad hoc committees (such as that on arthritis), in the library, in the two special scientific journals, published at a loss, and, most of all, in the *British Medical Journal*. The motion was lost, but Sir Ewen remained unconvinced.

Medical Education

In presenting the report of the committee on medical education for general approval, Sir HENRY BRACKENBURY pointed out that an interim report which was now amplified had been before the meeting last year and no objections had then been made to its main propositions. It had since received a considerable measure of general endorsement, with only one dissentient. No stereotyped system of medical education was contemplated; provided a minimum was fixed there was ample room for differences of method and variety as between different schools. It was sought to raise somewhat the scientific status and general educational equipment of entrants to the profession; to design a coördinated course rather than separate blocks of study; to direct attention to health, its preservation, perfection, or restoration, and not to disease, so that a patient would be regarded as a person to be restored to the normal, if possible, and not as "an uninteresting vehicle containing some fascinating disease processes." The time of registration should be at the point where the study of human anatomy and physiology is systematically begun, and the student should previously have passed an examination such as the higher school certificate examination of the universities, taking subjects of general educational value as well as chemistry, physics, and biology. Normally the age of registration would not be below 18, but exceptional students, who had passed the necessary examinations, would be allowed to register at 17. A feature of the scheme was the insistence on a period of from six to nine months after the main part of the final examination had been passed before full licence to practise independently was granted. This period could be spent in a resident appointment or as a clinical assistant in a hospital, as a pupil assistant to a general practitioner or a medical officer of health, or in regular attendance at hospital practice at a medical school. The final examination would then be completed by a clinical and oral test which could be taken 57 months after registration, so that the length of the present curriculum need not be exceeded.

On getting the assurance of Sir Henry Brackenbury that a covering letter would be sent with the report intimating that only general and not necessarily detailed approval had been given by the various branches and divisions, Sir ROBERT BOLAM (for Newcastle) withdrew a cautious amendment to the motion recommending the approval and distribution of the report. Mr. ERNEST WARD (for Torquay) felt doubtful of the merits of a "decree nisi" which had to wait six months for confirmation (for example, could its holder become a locum?); but was informed that study of Sections 43 to 46 of the report (*Brit. Med. Jour.* Suppl. of April 21st, p. 193) would convince his division of the latitude of responsible work contemplated for the practitioner delivered into the world but still unregistered, and withdrew an amendment that this clause should be referred back to Council. The same fate, by permission, befell an amendment by Dr. HELEN LUKIS (for Kingston), which drew attention to the danger of allowing a student to qualify after administering only ten anæsthetics. In these days of varied drugs and methods and mechanisation of apparatus she felt that this number was quite inadequate, but readily consented to regard this as one of the small rocks which should not wreck the ship.

Sir Henry then proceeded, with the skill of an experienced pilot, to steer it to port through more formidable barriers sighted by Dr. Hawthorne, Dr. M. Manson, Mr. McAdam Eccles, and Dr. A. Gregory. Dr. MANSON regretted, among other omissions, the absence of provision for a one portal entry to the profession and of intelligence-quotient tests for students. Dr. GREGORY thought that the proposed additions to the curriculum, notably instruction in genetics, growth, minor operations, and the psychoneuroses, and additional clinical experience would more than cancel the relief offered from dissecting every part of the body or preparing histological sections. Ways in which the students' burden could be lightened were the removal of compulsory attendance at formal lectures, the diminution of time spent on major surgery, and the addition of two or three weeks to each term. Mr. MCADAM ECCLES feared that the curriculum would be increased in length, but he was convicted of an error in arithmetic, though it was admitted that part of the vacations might have to be used in work by students in the later stages of their course. Manchester had instructed Dr. Gregory to move an amendment asking the Council to urge the raising of the age of registration forthwith to 18, with the triple object of preventing the admission of immature students, of raising their standard of general education to correspond with the higher general standard among the public, and of restricting the entry to a profession which was becoming overcrowded. According to Dr. Gregory, the number of doctors on the register had risen by 19,000 between 1902 and 1932, while the population had not increased in anything like the same proportion. The effect of raising the age *forthwith* as proposed (registration not being compulsory at the present time) would, it was pointed out, defeat its own object, and even in the future Sir Henry Brackenbury was not prepared to penalise the exceptionally intelligent student by causing him to mark time between school and registration. The obvious desire of all who offered criticism of the report from various angles not to delay its circulation was a notable tribute to the wisdom of its provisions, which were duly adopted.

Ethics of Medical Consultations

The rules upon the ethics of medical consultations in private practice as redrafted were submitted for the consideration of the Representative Body by Dr. HAWTHORNE, for the Council. An amendment (for Torquay) by Mr. ERNEST WARD substituted the milder expression of "regulations" for "rules" and was lost. The first ten of the 11 rules, which were accepted and passed without comment, contain an interesting new clause—including among the circumstances under which it is especially desirable that the attending practitioner should endeavour to secure consultation "when continued administration of any drug scheduled under the Dangerous Drugs Acts is deemed desirable in the case of a person who does not need it otherwise than for the relief of symptoms of addiction." The last clause in the following proposed rule (No. 11) gave rise to keen discussion.

> The practitioner consulted shall not supersede the attending practitioner during the illness with which the consultation was concerned, nor shall he act as attending practitioner to the patient in any subsequent illness, except after an explanation given to his former colleague, unless circumstances should make this latter course impracticable.

Dr. J. T. D'EWART (for Manchester) proposed the deletion of the last eight words as giving a loophole for evasion. Dr. HAWTHORNE, as chairman of the Ethical Committee, deprecated such rigidity as the rule would then demand; the former practitioner might be retired, travelling, or even dead. The amendment was lost, as was also one by Dr. H. M. BIRD (West Suffolk) to substitute "impossible" for "impracticable," and the proposed new rules were accepted without alteration.

The following set of four rules under the heading

Other Intra-professional Obligations in Private Practice

are new in the sense that no corresponding paragraphs appear in the existing rules.

1. When a practitioner in whatever form of practice believes that a patient who requests him to give advice or treatment is not under the care of another practitioner he is at liberty to do so, unless he has previously seen the patient in consultation with a colleague or when acting as deputy for a colleague. In either of these events, while dealing with any emergency that may exist, he should forthwith explain the position to his colleague.
2. A medical practitioner, before superseding another in the care of a patient, must satisfy himself that the other practitioner has been duly informed by those responsible for the patient that his services are no longer required.
3. When a practitioner in whatever form of practice is asked for advice or treatment by a patient and has reason to believe that the patient is already under medical care, and that the request is made without the knowledge of the attending practitioner, it is the duty of the practitioner so approached to urge the patient to permit him to communicate with the attending practitioner. Should the patient refuse this proposal the practitioner is at liberty to examine the patient and to tell the patient his findings and conclusions, but he shall not accept the patient for treatment.
4. When a practitioner in whatever form of practice is requested by a patient or the patient's representatives to visit him for the purpose of giving advice or treatment, and has reason to believe that another practitioner is in attendance, it is his duty to inform the patient that he cannot attend without the presence or consent of the practitioner actually in charge of the case. If the attending practitioner, after being duly informed, declines to meet the practitioner who has been invited, and the patient or his representatives persist in the request in full knowledge of this fact, or if the attending practitioner retires from the case, it is open to the other practitioner to provide the medical care required.

In introducing them, Dr. HAWTHORNE outlined the principles which they embody. While a practitioner is within his moral and legal rights in accepting any patient, this charter of liberty is qualified by considerations in the interests of the patient. Thus, if he knows that the patient is under the care of a colleague he must beg that this colleague be informed, or must refuse to accept the patient, except of course in emergency. The patient also may seek advice where he will; he may consult several doctors on the same issue, and may desire or demand a second opinion by, or even against, the advice, or with or even without the knowledge, of his attending doctor. But the claims of courtesy between colleagues remain. Alternative policies would be (*a*) no rules at all, in the conviction that the great majority of the profession play cricket according to recognised though unwritten rules, or (*b*) the division of the profession into two groups, one with experience and cultivated skill, to give second opinions, and the other with the wide horizon of the general practitioner. Such an arbitrary division would be condemned by public opinion, resisted by patients, and ignored by some doctors; moreover, any attempt to impose on a group an obligation not to give a second opinion would be resisted. It would be possible to stand by either of these policies (*a*) or (*b*), but not to combine them.

Many amendments were tabled. Dr. W. E. HEATH, for Rochester, Chatham, and Gillingham, desired (in vain) the remodelling of rule 2, or the reference back of the whole batch. Dr. H. GUY DAIN (Birmingham) claimed that the profession was already divided into two compartments and that a specialist must forgo certain privileges and opportunities that the general practitioner could enjoy. This amendment recognised the two groups as separate, and while forbidding those engaged in consultant or specialist practice to give advice or treatment to a patient at the latter's request, would allow the general practitioner to do so if he believes that the patient is not under the care of another practitioner. Sir ROBERT BOLAM pointed out the existence of an intermediate class for which Dr. Dain's resolution proposed no course of conduct—e.g., general practitioners doing valuable work as consultants in districts where no recognised consultants exist. Dr. HAWTHORNE said that though it might be in the interests of practitioners to confine themselves to one form of practice they could not be forced to do so. Birmingham's amendment was lost; one by Dr. A. K. GIBSON for Kensington to substitute (for the sake of uniformity) "has reason to believe" for "believe" in rule 1 was accepted by Dr. Hawthorne, as was also Dr. E. R. C. WALKER's proposal to clear up ambiguity in rule 1 by the substitution of the words "to accede to the request" for "to do so." Dr. PETER MACDONALD's amendment (for York) to refer rule 3 back to the council or, better, to the consultant group of the Association, was moved on the grounds of the difficulty which might confront the consultant whose patient refused to allow him to communicate with his doctor. "Under medical care" was an ambiguous phrase. For example, a patient under treatment by an ophthalmologist for tobacco amblyopia might be under his family doctor for a sprained ankle. The supreme instance where this rule would break down would be the case of venereal disease. The amendment was lost.

Buxton (Dr. L. S. POTTER) wished to legislate separately for treatment of a nature which could not reasonably be carried out under the direction of the usual medical attendant (e.g., spa treatment). Lewisham (sponsored by Dr. S. D. BHABHA in the absence of Dr. L. W. Bain) and North Northumberland (Dr. R. A. WELSH) were prepared to demand unconditional refusal on the part of the doctor even to examine a patient who will not allow communication with his own attendant, Dr. Welsh maintaining that it is better to lose a patient than a friendly neighbour; at any rate, the patient should be off with the old love before being on with the new. Manchester, with Dr. D'EWART as spokesman, supported by Holland (Dr. A. S. WILSON), would have "urge" strengthened to "insist" in line 6 of rule 3, and the last sentence of the rule deleted. Dr. F. A. ROPER, for Exeter, pointed out the fundamental difference that may exist between the lay view as to a patient's rights and that of an association of doctors—exemplified by the out-patient controversy. The Association held that no out-patient should be treated without a letter from his doctor, but King Edward's Hospital Fund thought otherwise. Dr. HAWTHORNE, for the ethical committee, felt that "insist" was a dangerous term to use to a patient, who might in his turn insist on the doctor ringing the bell in order that he might be shown out of the house. Sir HENRY BRACKENBURY took exception to an amendment moved by Dr. D. D. STENHOUSE STEWART, for East Yorkshire, to insert after the words "medical case" in rule 3, "in respect of the condition upon which his opinion is sought"; he quoted the truism that doctors do not treat diseases but a patient, and the meeting agreed; nor did Dr. DAIN, speaking for Birmingham Central, convince the Representative Body that to delete the words "in whatever form of practice" in the first line of rule 4, and to add the word "general" before practitioner in the same line would be a desirable alteration.

The rules were then accepted in their original form except for the minor corrections in rule 1 noted above. At this point the proceedings were interrupted for the announcement that Mr. H. S. Souttar had been elected chairman and Dr. Dain deputy-chairman of the Representative Body, 1934–1935.

Ethical Rules for Medical Inspectors

Considerable argument centred round the question whether a medical inspector (other than a school medical inspector) should himself be charged with the duty of informing the attending practitioner of the date, time, and purpose of his visit to a patient, or whether he could delegate this responsibility; the problem was solved by the inspiration of Dr. J. W. BONE to use the words "himself or through an agent" in the relevant clause.

Schools of Chiropody and Foot Hospitals

Dr. R. L. LANGDON-DOWN, acting for the chairman of the ethical committee, who in this instance dissented from the majority of his colleagues, proposed—

> That the medical profession should accord a measure of recognition to approved chiropodists who accept the following definition of their work:—
>
> > Chiropody means the treatment of abnormal nails, and all superficial excrescences occurring on the feet, such as corns, warts, callosities, bunions,
>
> and undertake:
>
> (a) to confine their practice to the field set out above;
>
> (b) not, even within the above field, to operate for (1) any congenital or acquired deformity; (2) any condition requiring either a general anæsthetic or a local anæsthetic given by injection; (3) any condition involving any structure below the level of the true skin;
>
> (c) not to treat any patient who is at the time under the care of a medical practitioner without his knowledge and consent.

Dr. Langdon-Down described chiropodists as an ancient confraternity, giving a service accepted (if silently) and even utilised by the medical profession and appreciated by the public. The field in which these specialists worked was restricted and was not cultivated by medical practitioners. The service was rendered without detriment to the public and without giving rise to any serious complaint. Of recent years the public had tended more and more to resort to chiropodists, whose methods of work and arrangements for receiving clients had developed correspondingly, and institutions such as foot clinics and foot hospitals were being widely established. Associated with this activity was the extension of courses of training. For many years members of the medical profession had assisted in this training by giving lectures and conducting examinations, and now the chiropodists aspired to a register for their members, with standards of instruction and conduct for those inscribed thereon. The ethical committee had invited doctors intimately acquainted with the aims and work of chiropodists to send relevant documents and to discuss their status. The committee had been impressed with the evidence of the good faith of the applicants for recognition, with the value of their work, and with the need for its medical recognition. The time had come when doctors must either recognise or oppose organised chiropody. One of the minor issues was the acceptance or rejection in the *British Medical Journal* of advertisements for practitioners to help them in their organisation. There were many groups of chiropodists, but the *Incorporated Society of Chiropodists* was *apparently* the most important and was the one which had sought the coöperation of the Association. The two main issues were (1) what is to be the sphere of chiropody; what limitations should be placed on the activities, practice, and behaviour of its practitioners; (2) in what relation were these to stand to the medical profession if the latter should grant them some sort of recognition. The applicants had been surprisingly ready to accept suggestions for limitation of their sphere implicit in the proposed definition. The difference between this specialty and others which had been granted recognition was that practitioners of these others undertook not to treat any patient except under the direction and control of a registered medical practitioner. Serious practitioners of chiropody could hardly be asked to submit to this condition, because the public would assuredly not accept the position and would be driven into the hands of unrecognised chiropodists who were under no such obligation. The clause was appropriate to such specialties as massage or electrical treatment, because the doctor was in a position to direct and supervise them, but the patient long accustomed to employ a chiropodist could hardly be asked to enlist the supervision of his doctor every time he went to have his corns cut. Insistence on a rule that must become a dead letter would be highly inadvisable. Chiropody was a limited and fairly easily defined sphere of work, and men properly trained in the art would be all the more competent to distinguish cases which should be referred to a doctor. Long continued treatment like that needed for corns was in a different category from occasional treatment such as massage. It remained to be considered, if recognition was granted, what form it should take. Coöperation would doubtless be sought in respect of courses of training and assistance in lecturing; doctors would be asked to send patients to chiropodists for treatment when this seemed desirable; the columns of the *British Medical Journal* would be open to advertisements ; and transgressors among approved chiropodists against the code of conduct laid down would be reported. Here was an opportunity, concluded Dr. Langdon-Down, which should be seized. If the medical profession stood aloof it would lose the power of directing and limiting the development of the specialty, or would force the public into the hands of those who might have an entirely inadequate training.

An amendment was moved by Dr. Hawthorne, for Marylebone, and seconded by Sir Robert Bolam, for Newcastle-on-Tune.

That the work of chiropodists in dealing with corns and callosities being already known and utilised, the Representative Body does not approve of giving an official collective recognition to approved chiropodists in a more extended field.

Dr. Hawthorne said that chiropody was either (1) an æsthetic enterprise, or (2) a therapeutic measure. If it was the former, the medical profession had no more concern with it than with manicure or hairdressing: if the latter, diagnosis must precede treatment, and the minimum training for diagnosis was the medical curriculum. It was to the public interest to distinguish between those who offered treatment after having been trained under this curriculum and those who had not, and the medical profession must not help to confuse the issues between these two groups. The maintenance of these principles need not imply the expression of animosity, nor that the medical profession was anxious to put down unqualified practice; it did not imply restriction *on any one member of the public from giving advice* to another, even for a fee, or the prevention of any person from taking such advice. It implied only that responsibility for taking such advice rested on the patient himself. One at least of the foot hospitals had in a shop window cushions for heel and arches for feet and a diagram showing that 25 per cent. of the ills that affect mankind are respiratory; but a footnote added that a predisposing cause was the flattening of the arch of the foot or a similar misfortune. If the arch of the foot had to sustain such a pathological burden, said Dr. Hawthorne, no wonder it collapsed under the strain. Sir Robert Bolam, in seconding, said that to legislate for a subsidiary profession and help map out their course of training would be a heavy burden of responsibility which it was not the medical profession's business to shoulder. The proposal was to legalise invasion of the ranks of certain specialist surgeons and also of general practitioners. Not all general practitioners refused to treat corns. It was, moreover, dangerous to allow persons who had not had a medical training to treat warts wherever these should occur. In regard to nails—surely abnormalities were mainly due to nutritional causes or to infection. Neither of these should be treated by a chiropodist. There was no desire to interfere with chiropodists, but also no desire to accord to any persons recognition for work in a medical field.

Dr. Eliz. Casson (Bristol) said there was no doubt that the care of corns was generally inefficient. The chiropodist started off with a knife in his hand, which was a surgeon's prerogative. From her large experience of looking after the feet of patients at a mental hospital she had come to the conclusion that most patients needed not so much the cutting of their corns but treatment of a fungus infection. Dr. J. H. Thompson dwelt on the difficulty of controlling such a service, and then Sir Henry Brackenbury set out the present position.

They were not, he said, concerned with definition of the field to which the chiropodists could properly be allocated, but with whether recognition in *any* field should be granted. He asked the meeting to dilute strict logic with a little common sense. There was a practical situation to be dealt with. The chiropodists were rapidly and increasingly extending their activities beyond the field in which they should properly work and the council had been approached, with a view of regulating the position, by orthopædic surgeons and dermatologists. At least one hospital in London, and several in the country, had a chiropodist's department, employing chiropodists. There was a *foot* clinic and school of chiropody in Edinburgh, with which nine eminent members of the medical profession were associated, and on terms of mutual cordiality. The council of the Royal College of Surgeons of England held that some form of recognition should be given, and the meeting must bear in mind the possibility that recognition might be awarded by other bodies in the medical profession. The purpose of the council was to establish the propriety of a doctor sending a patient with a corn to a chiropodist if he so desired. Dr. Hawthorne's emphasis was on the need for diagnosis, but surely a layman knew when he had a corn. There was now an opportunity to keep chiropody in a certain field, binding the main body of that profession to accept defined limitations. Mr. F. C. Pybus, for the amendment, remarked that, generally speaking, pathological foot conditions were the result of deformities which were the concern of the doctor, and that a person without medical training might fail to distinguish melanotic sarcoma from a simple wart. Dr. Noel Waterfield was for accepting and controlling the situation. Dr. J. S. Manson agreed with Dr. Hawthorne, that the evidence of the spread of chiropody should make us suspicious and critical. Practitioners of the art were now being installed in drapers' shops as a lure. At one school a syllabus of over 700 lectures on anatomy, physiology, bacteriology and so forth was included in a course extending over four months, for which 30 guineas was paid, and in others the course lasted two years and cost 70 guineas. Dr. De. Lisle Gray said that the very fact that these schools were going ahead meant that unless action was taken their position would be consolidated. He was impressed by the willingness of chiropodists to enlist the support of doctors, and to follow our ethical ruling. There was no reason why the responsibility for guidance should be shirked. Dentists had been helped in this way and patients now went straight to dentists as a matter of course. In view of the fact that chiropody had been recognised by orthopædic surgeons the motion ought to be supported. Dr. Helen Lukis also spoke against the amendment. Most doctors, she said, had no desire to acquire a reputation as corn cutters, or to give ten minutes of an evening surgery to soaking corns. Dr. E. R. C. Walker remarked that conservatism was not always synonymous with wisdom. In an atmosphere of friendly coöperation the chiropodist was much less likely to exceed his duty.

Dr. M. J. Fenton supposed that the Incorporated Society of Chiropodists wanted recognition in order to deal with small, unofficial organisations which gave an unsatisfactory training; but Dr. L. Cohen wondered what guarantee there was against a split in the ranks of chiropodists, of which one group, not accepting the agreed limitations of practice, might advertise themselves as "recognised by the B.M.A.," and get patients; while the others could say "*not* recognised by the B.M.A." and get still more patients. If the proposal for recognition was accepted the patient would tend to go to the chiropodist for all foot complaints. He suggested that this was the thin end of yet another wedge to whittle down the practice of doctors—a metaphor none the less effective for being mixed. Having started with the feet, might we not soon reach the head and have to deal with sight-testing opticians? Mr. Souttar opposed the amendment. This was a larger question than that of corns. It was desirable to recognise ancillary services as they sprung up—for example, midwifery, massage and radiography. Should the chiropodists be allowed to develop independently of doctors, or were they to be controlled? Many of them were highly trained specialists, organised by medical men, and taught by orthopædic surgeons. Should not support be given to a body of men who want to be helped to do better work? Dr. Langdon-Down said that surely it was not statesmanlike to shut down the whole question rather than to discuss freely the mode of recognition and conditions which might bring the specialty under proper control. Dr. Hawthorne, in his final appeal for the amendment, said that chiropodists were apparently not to be asked never to treat a patient, as were members of recognised auxiliary services, except "under the direction and control of" a medical man. This was the crucial point.

The amendment was carried by 102—65.

Agency for Introduction of Patients

Dr. Hawthorne differed from the ethical committee on another important question, and yet again an amendment sponsored by him was accepted contrary to the advice of the council. He proposed as an amendment:—

> That the Annual Representative Meeting regrets that the practice of the British Medical Bureau in relation to advertisements in the lay press and to the payment by practitioners to the Bureau of a proportion of fees received from patients remains without modification.

He explained that the British Medical Bureau was an agency for the sale of practices. The association took a share in its management and a substantial dividend from its profits. Among its activities was the maintenance of a list of practitioners who were prepared to take resident patients, and paid a guinea for the first year and 5s. for each subsequent year for a box number. Whatever fee the practitioner received from a patient was subject to a deduction by the Bureau. The first complaint was that this fee was payable as long as the patient remained in his house—that is, it amounted to a commission, and the second was that the list was advertised in the lay press with the object of attracting patients to one of the group of practitioners on the list. Supposing, said Dr. Hawthorne, a number of doctors, practising, say, deep X ray therapy, formed a bureau and employed an advertising agency, would that be considered ethical? Again, the fact that fees were subject to deduction was not specifically explained to clients and thus became a sort of secret commission. Dr. Casson said that a large number of practitioners took resident patients, and some were penalised because the British Medical Bureau recommended only those who were prepared to pay them a 10 per cent. commission. It was understood that the association had taken over the Bureau, which was formerly called the Scholastic, Clerical and Medical Association, Ltd., in order to have an agency adopting its code of medical ethics, but the result seemed to have been otherwise. Prof. J. W. Bigger was jealous for the honour of the association. The practice described was essentially a form of dichotomy, a secret commission divided not into two but into thousands of parts. He would doubtless be told that the Bureau was a profitable investment, but ethical considerations came first. Dr. J. W. Bone put up a stout resistance to these attacks, drawing attention to the professional and personal eminence of the directors of the Bureau, which had been conducted on much the same lines for over 40 years. He gave a brief history of what he described as a vendetta by a small group of representatives against its activities. When, in 1926, the Association had bought shares in the Bureau it gave an undertaking not to interfere with the work of the agency as a business concern or with its policy unless this conflicted with that of the Association. The attacks had been carefully considered by the directors, who reported to the ethical committee that (1) the register complained of had been published for more than 41 years, and had been advertised in lay as well as in medical papers; (2) practically all the applications came from advertisements in the lay press; (3) they did not regard the advertisements as unethical but as necessary for the business of the agency; and (4) it seemed clear the cost must be met by beneficiaries, and a continuous commission seemed to be the best method yet devised of arranging this. On this report the council had resolved by 44 votes to 3 that the practice of the Bureau did not conflict with ethical principles. Dr. E. H. Snell drew attention to the wide implications of this apparently simple amendment; if the procedure condemned were wrong so would be the acceptance of advertisements in the *British Medical Journal* for institutions for sick people, and of some at least of the money received by the vendor when selling a practice. Dr. DE LISLE GRAY said that surely it was insulting the intelligence of those who used the agency to assume they did not realise that a commission was paid. Sir ROBERT BOLAM pointed out that these advertisements had appeared in the same lay papers—the *Times*, the *Morning Post*, and the *Law Times*—for many years before the Association had any interest in the Bureau. He challenged the suggestion that such a commission as was paid was unethical; it was always understood that agencies charged a commission, either as a lump sum or piecemeal, and there was nothing wrong in this. If the meeting was not satisfied it must say so, when the directors of the Bureau would have to consider the question of resignation.

Somewhat surprisingly to most of those who observed the battle it did say so, passing the amendment by 94 votes to 76.

(*To be concluded*)

AMERICAN MEDICAL ASSOCIATION

EIGHTY-FIFTH ANNUAL MEETING

THIS year's meeting in Cleveland was characterised by large attendance (6293), excellent scientific and technical exhibits, and a growing recognition in its business sessions of the coming crisis in medical economics. The presidential address was largely concerned with the over-supply of doctors—not at all with the crying need of large sections of the population for more adequate medical care. In an age and a nation where it is reasonable to plough under cotton and wheat crops, it may not be surprising to hear the same type of remedy suggested for the excess of physicians, viz., a limitation of production.

The probability that health insurance, among other kinds of social insurance, may be discussed in the next session of Congress was foreseen. The time-honoured opposition of the Association to "any system whereby the State would in any way enter into the practice of medicine" was re-affirmed, but in so far as health insurance goes somewhat more temperately than in the past and not without evidence of a division of opinion among the rank and file. Indeed, the Michigan State Medical Society introduced a resolution in which it was stated that its commission sent to investigate health insurance in England had furnished a report which "raises certain grave questions concerning the policy of the officials of the American Medical Association toward health insurance and the effects of this policy on the practising membership . . ." This resolution was considered in executive session of the house of delegates, which means that all non-members of the house of delegates were excluded. A motion to have the resolution considered by the house as a committee of the whole was lost and a motion carried referring the matter to a special committee. This special committee succeeded in bringing in a report acceptable to the house. This report exonerates the officials of the Association, reviews the history of the opposition of the Association to compulsory health insurance, and concludes with ten principles laid down by the board of trustees as the essential bases for experiment in sickness insurance in the United States. As there is nothing in these ten principles inconsistent with a scheme for compulsory health insurance, their inclusion in the committee's resolution may perhaps be intended to offset to some extent their recital of opposition to insurance. Dr. J. D. Brook of Michigan suggested that a standing committee of seven members of the house of delegates be appointed to continue a study of this question, but his resolution was tabled.

The committee on medical economics gave some hint of the future policy of the Association in a report which states: "All said and done, sickness insurance was the product of the brain of the German chancellor, Bismarck, just half a century ago. Why? Not that adequate medical care should be provided for all, but because industry required the standardisation of expense to make more certain the exact cost of production, the better to meet keen world competition." This should be read in relation to a resolution from Indiana delegates, which points out that in European experience labour unions have never led a demand for sickness insurance, and requests the board of trustees to appoint a committee to contact, at the proper time, the leaders of organised labour.

A resolution roundly condemning the Nazi régime for expelling medical scientists "without justice or reason other than that they differed in racial origin or religion from that of their colleagues" was presented from New York. The committee on legislation and public relations, however, did not endorse this resolution, considering that the matter was covered by the more general terms of a resolution passed last year condemning the persecution of any individual on account of race or religion by any State, or under any flag. A California resolution complained that one of the departments of the Association had been recommending the pasteurisation of certified raw milk. This matter was referred to the committee on foods. The radio stations were thanked for their coöperation in matters of public education, but at the same time the board of trustees was asked to attempt some method of controlling the evil of the broadcasting of "unestablished remedies." A strongly worded resolution in condemnation of this practice was also addressed to the Federal Radio Commission.

For president-elect of the Association two names were placed in nomination: Dr. James S. McLester of Birmingham, Alabama, and Dr. Hugh S. Cumming, surgeon-general of the U.S. Public Health Service. The former was elected by 85 votes to 71. Dr. McLester is a native of Alabama, a graduate in arts of the University of Alabama and in medicine of the University of Virginia. He has studied medicine abroad at Göttingen, Freiburg, Berlin and Munich, and has had a distinguished career as teacher and practitioner in his native State. The meeting next year is to be held in Atlantic City.

LEASOWE OPEN-AIR HOSPITAL FOR CHILDREN.—This Liverpool hospital, near Leasowe, in Cheshire, with the beginning of the present year, has introduced a method of closer coöperation of the honorary medical staff and the resident medical officer. Under the new system all cases are admitted direct into beds allotted to honorary medical and surgical officers who will be responsible for their treatment. The report of the resident medical officer states that of the 572 patients treated 219 were cases of tuberculous bone and joint disease; of the non-tuberculous cases 199 were orthopædic. The average stay of the discharged surgical tuberculosis patients was 671 days; of the 67 discharged 88 per cent. were discharged with the disease quiescent; 4 cases were discharged unimproved. All tuberculous adenitis and tuberculous peritonitis cases were discharged in excellent condition with the disease quiescent after an average stay of 104 days.

THE LANCET

LONDON: SATURDAY, JULY 28, 1934

TYPHOID VACCINE: POTENCY AND VIRULENCE

RECENT years have witnessed an exuberant growth in our knowledge of the antigenic structure of bacterial cells. The resulting literature offers a formidable meal even to the professed immunologist, who must perforce attempt its digestion. But those whose interest lies on the practical rather than on the theoretical side, noting that exuberance has in this case justified its literal significance of fruitfulness, will desire to master those elements of the newer knowledge that have an immediate bearing on the practical problems of immunisation. In our present issue Dr. FELIX and Miss PITT record their latest observations on the factors involved in the virulence of the typhoid bacillus as tested in mice. In earlier studies they showed that strains of high virulence have, in the living state, the curious property of being relatively inagglutinable by sera that contain a high titre of antibodies acting on the "O" somatic antigen, which is one of the most characteristic components of "smooth" strains. In their present paper they show that this inagglutinability is associated with the possession of an additional antigenic constituent, that can be clearly differentiated from the ordinary "O" antigen by selective absorption of the corresponding antibodies. Mice immunised with a vaccine containing this additional antigen in an active form are rendered resistant to the injection of highly virulent bacilli. Mice immunised with a vaccine from which this antigen is absent remain susceptible to virulent strains. Antisera prepared by immunising rabbits with living virulent bacilli protect mice against infection with these strains; antisera prepared by immunising rabbits with killed virulent bacilli, or with avirulent smooth bacilli, have no such protective action. It would seem that heat-killed virulent bacilli have suffered an impairment of the antigenic potency of the particular component associated with high virulence sufficient to inhibit its capacity for inducing efficient antibody-formation in the rabbit, but insufficient to prevent the induction of active immunity in the mouse. If a relatively avirulent strain is used for testing—in which case the lethal dose of living organisms does not fall far below the lethal dose of killed bacteria, so that death must be regarded as resulting from toxæmia rather than from bacterial invasion of the tissues—it is found that the ordinary antisera, containing the "O" antibody, are at least as protective as the sera obtained by immunisation with living virulent bacilli. The new antigen and its corresponding antibody would thus seem to be concerned particularly with the reactions that inhibit tissue invasion.

Dr. FELIX has clearly added another observation of great practical importance to those that already stand to his credit in this field. Whether the sharp distinction that he draws between this new antigen, as determining virulence, and the ordinary smooth somatic antigen, as being mainly concerned in toxicity, is fully justified, and whether the facts that he has demonstrated in the case of the typhoid bacillus have analogies in other bacterial species, only the future can show. The essential significance of his findings lies in the demonstration that it is not enough to prepare our vaccines from smooth strains, as we had already learned to do, but that one smooth strain differs from another in its antigenic structure, and that we must select smooth strains possessing the right kind of antigen if we wish to protect against attack by strains of high virulence.

These observations of FELIX and PITT offer an explanation of the interesting results recorded by PERRY, FINDLAY, and BENSTED in a series of reports from the pathological department of the Royal Army Medical College. These workers had already been led, on the basis of a considerable series of experiments, to the conclusion that virulence for mice, rather than mere smoothness in the usually accepted sense, offers the best criterion of immunising power. In their latest paper[1] they offer additional and more detailed evidence in support of this view, showing that none of the commonly accepted tests for smoothness—colonial appearance, stability in saline, a negative Millon reaction, or the agglutinability of killed cultures by an "O" antiserum—can be relied upon as a proof of immunising value. They note, in agreement with the findings of FELIX and PITT, that their virulent and highly immunising strains are, in the living state, relatively inagglutinable with an ordinary "O" antiserum, though one at least of their agglutinable strains has shown a quite definite immunising capacity. Those who have a liking for tradition will learn with pleasure that the famous "Rawlings" strain of typhoid bacillus, which has played so honourable a part in the history of antityphoid inoculation, has, after a temporary lapse into senility and ineffectiveness, been successfully rejuvenated, and is now the most potent of the tested strains.

RE-EXAMINATION OF MENTAL DEFECTIVES

SOME characteristically outspoken remarks by the Recorder of London have drawn attention to the long intervals which the law interposes between the official occasions for reconsidering the detention of mental defectives in institutions. Sir ERNEST WILD's comments were uttered in the course of criminal proceedings against GEORGE HENRY NEWTON, charged with an offence against a young woman who is under treatment at the Manor Certified Institution at Epsom. NEWTON was stated to be a married man, aged 31, living apart from his wife. The patient had been received at Epsom in January, 1931, under the usual order which is valid for 12 months and is subject to continuance under certain statutory conditions. She had been allowed out for the day on leave of absence from time to time; NEWTON, it was said, took her to his room for a week. He pleaded guilty to the charge. The young woman's alertness and intelligence in giving evidence obviously impressed the Recorder. She said she was 24 and had been at Epsom for 4 years. "Are you happy there?" asked the Recorder. "Well, not too bad," she answered. "Do you want to stay there?" "Well, I should like to get out as soon as I can." The Recorder observed that it was wicked that "these wretched creatures" could be detained for five years without any recent certification. "I think it is an interference with the liberty of the subject that there should not be an examination for five years." He desired a special examination to be made by one or two independent doctors to see if the young woman was a proper person to be detained any longer. The legal effect of the proposed examination is doubtful, but some of the learned Recorder's observations had suggested that he was unaware that the authorities in the case before him had followed the exact procedure prescribed by Parliament in the interests of the patients. In any event, the Old Bailey is hardly equipped to act as a court of appeal from the Board of Control. The judicial duty before Sir ERNEST WILD was the sentencing of NEWTON for a criminal offence upon a mental defective; he awarded a sentence of 12 months' imprisonment in the second division, telling him that he deserved no mercy. Had the issue been the duration of the patient's detention, it would have been material to know the full facts and medical opinions relative thereto. Judges and magistrates, of course, are sometimes moved to travel outside the judicial province and to denounce the law which it is their business to administer. There are famous instances where the ironic comments of the bench have led to the reform of obsolete or inconvenient legislation.

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[1] Jour. Roy. Army Med. Corps, 1934, lxiii., 1.

Under sub-s. (1) of Section 11 of the Mental Deficiency Act of 1913 an order sending a defective to an institution will expire a year later unless continued in the manner prescribed by the Act. Sub-s. (2) enacts that the order will remain in force for a year after the date when under sub-s. (1) it would have expired, and thereafter for successive periods of five years, if at that date and at the end of such period of one and five years respectively the Board of Control considers that the continuation of the order is required and makes an order for that purpose. The Board, before deciding upon continuance, is obliged by the Act to consider certain special reports. It must first consider a special report by the visitors (made within a month after having seen the patient) as to his or her mental condition and the means of care and supervision which would be available if he or she were discharged. The visitors must state whether they think the patient is "still a proper person to be detained in his own interest in an institution." Secondly, the Board must consider a special report by the medical officer of the institution as to the patient's mental and bodily condition. The latter report must be accompanied by a certificate that the defective is still a proper person to be detained. Thirdly, the Board must consider the report of any duly qualified practitioner who, at the request of the patient or his or her parent or guardian, has made a medical examination of the defective and the means of care and supervision available on discharge. It is worth while to remember the statutory insistence upon the "care and supervision" available on discharge when one recalls the hospitality which NEWTON offered. No other statutory provision for reconsidering the patient's detention exists except that, when the patient enters an institution while under 21, the visitors must reconsider the case within three months of his or her 21st birthday.

These being the requirements prescribed by Act of Parliament, it is hard to see any legal significance in the examination "by one or two independent doctors," which the Recorder has asked for. He can express a personal opinion that the law is wrong: but it would be unfortunate if his remarks gave the impression that the authorities in charge of the institution at Epsom have taken a fiendish delight in confining for five years without medical examination a patient who is perfectly sane. This would tend to foster the prejudice which sometimes inspires the award of vindictive damages against doctors in cases of lunacy certification. If the Mental Deficiency Act is a bad one, let it be repealed or amended. Meanwhile let us have fair play for the authorities who endeavour scrupulously to obey it in the interests of the patients themselves.

THE PATHOGENESIS OF ŒDEMA

OPINION about the cause of œdema in nephritis, having forsaken the kidney for the plasma proteins, has lately shown signs of going back to the kidney, and now hovers uncertainly between the two. The renal hypotheses, which were discussed in these columns not long ago by Prof. SHAW DUNN[1] and Dr. ROBERT PLATT,[2] are somewhat involved. The theory that œdema is due to lowering of the concentration of the plasma proteins is, on the other hand, comparatively simple; it arises from a belated application of the principle, established by STARLING, that the secretion of fluid into the interstitial spaces—excess of which produces clinical œdema—is governed by the hydrostatic pressure within the blood capillaries, offset by the colloidal osmotic pressure of the plasma proteins. Pending a final explanation of œdema in nephritis—and it seems likely to incriminate both factors—it may be instructive to turn aside and consider how far lowering of the plasma proteins can be held responsible for various non-nephritic kinds of œdema, and particularly those associated with malnutrition.

Prof. W. T. LONGCOPE,[3] who has collected evidence bearing on this question, describes several cases in which œdema arising in the course of conditions like amœbic dysentery and malnutrition could be correlated with lowering of the level of the plasma protein, apparently from protein starvation, and corrected by promoting the normal absorption and digestion of protein. He also reminds us that the same factor can be at work in the forms of dropsy commonly found in famine areas, in prisons, and in patients suffering from severe anæmia or tuberculous enteritis with diarrhœa. He wisely points out, however, that other ætiological factors must not be ignored. The rapidity with which the plasma proteins are regenerated from the enormous reserves of the muscles is so great, and the amount of protein on which the body can contrive to maintain nitrogen equilibrium is so small, that the degree of protein starvation must be very high before œdema is likely to occur solely from this cause. In one of Longcope's cases, indeed, the protein reserves were so much depleted that during treatment the patient retained an average of 17 g. of nitrogen (that is, over 100 g. of protein) a day. It must also be remembered that Benedict and others have starved normal subjects of everything but water for as long as four weeks without causing visible œdema. Perhaps the most important subsidiary factor to be considered is the salt intake. Since œdema fluid always consists of salt and water in the proportions found in normal saline, dropsy cannot develop when the intake of salt is curtailed. It cannot occur, therefore, in absolute starvation. In the conditions described by Longcope, on the other hand, the salt intake is either normal or excessive, and œdema becomes manifest to a degree which can be varied, within limits, in either direction, by regulating the intake of sodium chloride. Nevertheless the temporary and inconstant response of nutritional œdema to low salt diets and diuretics shows that, in the production of œdema, the salt and water intake is of much less importance than the protein starvation. Other secondary factors which must not be lost sight of are mild degrees of heart failure, anæmia, and the influence of posture. In reviewing the causes of the œdema which sometimes follows operations, C. M. Jones, F. B. Eaton, and J. C. White [4] put most emphasis on protein starvation, loss of protein in serous and purulent discharges, and excessive use of rectal, subcutaneous, or intravenous saline.

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[1] THE LANCET, 1934, i., 1197.
[2] Ibid., 1934, i., 1257.
[3] New England Jour. Med., 1934, ccx., 1242.

Longcope also quotes evidence to suggest that the œdema observed in "acute yellow atrophy" and cirrhosis of the liver are likewise referable to lowering of the plasma protein. In cirrhosis the ascites can be reasonably explained on mechanical grounds, but the explanation of the œdema of the legs which is commonly seen has taxed the ingenuity of the theorist for years. It has variously been ascribed to nipping of the inferior vena cava by the contracting liver; to pressure of the ascitic fluid on the cava (but the œdema sometimes precedes the ascites); and—refuge of the pathogenetically destitute—to hypothetical damage of the capillary endothelium by still more hypothetical toxins. It is comforting to find a more reasonable explanation at last; but it remains, of course, to be ascertained why the plasma proteins should suffer depletion in diseases of the liver. It would be a mistake indeed to suppose that the problems of œdema, either general or special, are anything like solved. A low plasma protein is probably not responsible for the dropsy occurring in acute nephritis, in otherwise healthy adolescent girls, or during the treatment of pernicious anæmia with liver extract, of diabetic coma with insulin, and of hypothyroidism with thyroid preparations—to mention only a few examples. None the less, the recognition of the part played by protein starvation in the production of œdema in obscure nutritional disorders is of immediate practical importance in therapeutics.

THE WEEK AT BOURNEMOUTH

Assuming that for various reasons high summer is the most convenient season for a congress which involves prolonged indoor sessions, it would be hard to find a more delectable meeting-place than Bournemouth. The number of hotels of all grades from simple to luxurious, the proximity of spacious buildings to each other and to the sea, the amenities of the town and the beauty of the surrounding country are only some of its attractions. And when to these are added, as this year, weather which makes sea- and sun-bathing possible before 9 A.M. and after 6 P.M., it is small wonder that those attending the British Medical Association's annual meeting this year are enjoying themselves.

The agenda which faced the Representative Body when it assembled on July 20th at the Town Hall may well have alarmed the 97 new members, but the old hands were confident that Dr. E. K. le Fleming, now in his third and last year of office, as chairman, would lead them and, when necessary, drive them through it with his customary skill. And they were not disappointed, because they completed the work just in time to collect robes and walk in dignified procession to the official religious service, held at St. Peter's Church at 4.30 P.M. on July 24th. The four strenuous days had not been without their alleviations. Business was interrupted from time to time by such diversions as visits from the Mayor of Bournemouth and the president-elect of the Association, and by periodical announcements of results of elections and certain other figures—for example, 507 for 6—which bore no direct relation to the questions under discussion but caused intense interest. A pleasant interlude in connexion with the report on Overseas Branches was the appearance on the platform in succession of representatives of the divisions in places as remote as Trinidad, New Zealand, Malaya, India, Australia, Zanzibar, Mesopotamia, and Hong-Kong. All offered greetings, and some made an eager appeal for advance notice of the visit of any colleague from home, so that a gathering might be arranged to meet him and thus keep in touch with British work. Even those who greatly prefer to take their travels without thought of professional activities could hardly fail to be moved by this request.

The representatives' dinner was enlivened by the wit of Dr. J. B. Miller of Bishopbriggs, who sketched the individual characteristics of officers of the meeting with rich imagery. Later in the evening the representatives joined their ladies at a cabaret supper.

The meeting bids fair to rank as an outstandingly successful one.

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[4] Arch. Internal Med., 1934, liii., 649.

ANNOTATIONS

DEATH FROM ELECTRIC SHOCK

THE risk of dying from passage of electric current through the body is numerically small; the Registrar General during the last few years records only 50 to 60 violent deaths a year from electricity (lightning excepted). It is a curious thing that in spite of the widespread use of electric current for lighting in the home and as a source of power outside, the number of fatal accidents from its use is not on the increase, a tribute no doubt chiefly to the efficacy of means taken to safeguard the current, but partly, one may hope, to increasing efficiency in dealing with accidents when they occur. One result of the fewness of such injuries and their wide distribution is that only rarely does the practitioner meet with a case of unconsciousness from electric shock. But although their number may be no more than one a week, each death is a tragedy, for the victims are mostly young men in the prime of life, and it is a fact on which too much emphasis cannot be laid that in these cases more than in any other kind of accident survival depends on prompt aid. More than twenty years ago Dr. Reginald Morton, then president of the electrotherapeutic section of the Royal Society of Medicine, wrote a letter to our columns,[1] in which he stated that with the prompt application of first aid practically every victim can be revived, and of these nearly all will make a complete and permanent recovery, provided they were previously in a normal state of health. A current of 1500 volts is not necessarily fatal; Dr. Macdonald Critchley tells the story[2] of a boy who climbed a pylon and touched a wire carrying 11,000 volts with no untoward result other than some superficial burns and transient loss of memory. More recently Dr. Blake Pritchard who enunciated[3] a new theory of lightning stroke, confirmed the observation that the survivors of electrocution rarely have any permanent damage of the nervous system. Dr. Morton affirmed two fundamental facts: the first that death from electric shock is at first only an apparent death; the second that whatever the conditions or severity of the accident there is a period varying from a few minutes upwards during which artificial respiration will resuscitate the victim. So important is it, he remarked, to commence artificial respiration quickly that it is the bystander's first duty to see to this before doing anything else; he must not even leave the victim to summon medical aid, for it might be too late to render effective help by the time the doctor arrives. Of course he should send for medical assistance if there is anyone to send. Artificial respiration may revive the victim of electric shock within a minute or two; on the other hand, it may not, and there may be a long period during which artificial respiration is continued without any apparent sign of life. A recent circular (Form 1705, November, 1933) from the Factory Department, Home Office, tells us what was actually done in 50 fatal accidents reported to the department. In 15 of these artificial respiration was carried on for an hour or longer, in some instances under medical supervision; in 10 cases for half an hour, in 8 for 15 minutes, in 2 for 10 minutes, and in 1 for 5 minutes. In 6 of the 15-minute cases it seems that the doctor who was called in pronounced life extinct at the end of that time. In 4 cases it is definitely recorded that no artificial respiration was tried. In 11 of the cases, indeed where a doctor was on the scene within a few minutes of the accident, practically no attempt was made to revive the patient. The circular is quite definite in asserting that if a doctor on his arrival finds artificial respiration being practised he should not, because the heartbeat cannot be detected, presume life to be extinct but should advocate perseverance in artificial respiration. Evidence in the hands of the department makes it all too clear that the importance of immediate application of artificial respiration in cases of apparent death from electric shock, and of persistance in applying it, although generally appreciated now by electrical engineers, is not adequately realised by factory occupiers or, the circular adds, by members of the medical profession. Both the Silvester and the Schafer methods of resuscitation are applicable, the important thing being to apply one or other of them without a moment's delay. Artificial respiration should be combined with the inhalation of oxygen carbon-dioxide mixture as in the first-aid treatment of persons overcome by gas.

THE OXFORD OPHTHALMOLOGICAL CONGRESS

THE twenty-fourth annual meeting of the Oxford Ophthalmological Congress, held on July 5th–7th under the mastership of Mr. Cyril Walker, was attended by 116 members, and was distinctly overshadowed by the death on the eve of the meeting of Mr. Bernard Cridland, who had been the ideal organiser and latterly the master of many past congresses. On the first day a discussion on the functional diseases of the eye was opened by Sir Farquhar Buzzard and Mr. F. A. Williamson-Noble, the latter dwelling on the need for liaison between ophthalmology and psychiatry, a need illustrated later by Dr. William Brown from the disturbances of vision in war neurosis and the ocular symptoms in miners' nystagmus, for even in organic eye trouble the functional disturbance was often exaggerated by the mental reaction of the patient to his disability. Many members took part in the discussion which followed. In the afternoon of the same day Dr. H. W. Barber made an elaborate classification of diseases of the eyelids, their ætiology and treatment, and Mr. Tudor Thomas showed a patient on whom he had successfully performed his corneal graft operation. Later there was a garden party at Oriel College, and at the annual dinner in the evening at Keble Hall a presentation was made to Prof. Arthur Thomson in acknowledgment of his kindness in allowing the congress to hold its meetings from the start in the department of human anatomy.

Certain aspects of myopia were introduced by Dr. Thomson Henderson and Mr. Arnold Sorsby. Dr. Henderson regards myopia as a constitutional weakness, the yielding of the sclera to normal intraocular pressure being analogous to the yielding of the bones in rickets. If the constitutional weakness can be successfully combated, he said, the eyes will take care of themselves. Mr. Sorsby regards myopia not as a disease but as a normal variation in one direction, just as hypermetropia is a normal variation in the other, the refraction of the eye being the resultant not only of length of the optic axis but of other factors. Neither speaker had a good word to say for the still prevalent view that excessive convergence of the eyes causes myopia. Dr. Henderson submitted the following simple refutation of this theory: while the slightest pressure on the eyeball is enough to cause visible pulsation of the veins on the disc no such pulsation can be detected during voluntary convergence.

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[1] THE LANCET, 1912, ii., 1539.

[2] Ibid., 1934, i., 68.

[3] Ibid., 1934, i., 1163.

The Doyne memorial lecture was given by Prof. Joseph Meller of Vienna on tuberculosis in relation to spontaneous post-traumatic and sympathetic ophthalmia. He rejected the current idea that sympathetic ophthalmia is due to a poison introduced from without, and gave reasons for his belief that it is really a manifestation of tuberculosis. His paper will appear in the *Transactions* of the Ophthalmological Society at an early date.

Among the shorter communications was a note by Dr. Oliver Pratt on the influence of diet in ophthalmic practice. Dr. Pratt finds a connexion between migraine and faulty fat metabolism, and between some forms of conjunctivitis and excessive carbohydrate consumption aggravated by lack of vitamins. Hence the value of glucose in the form of barley-sugar tablets in the one case and of halibut oil in the other. Mr. Bernard Chavasse described thermoplasty of the extra-ocular muscles; Mr. J. J. Evans and Mr. P. J. Evans dealt with congestive glaucoma, Mr. F. Ridley with the action of lysozyme, and Mr. L. H. Savin with a case of uveoparotid fever. Mrs. Lythgoe related the results of her research on the production of rosettes in the mammalian retina.

PITUITARY BASOPHILISM AND THE SUPRARENAL GLAND

THE underlying cause of the disturbance conveniently called "basophilism" is still very obscure. In the female the clinical picture is pretty clear-cut: a rapidly acquired adiposity confined to the face and trunk, striæ atrophicæ in the skin hypertrichosis, amenorrhœa, and vascular hypertension, are the common manifestations of the condition; also there may be glycosuria and evidence of osteoporosis. Cushing has emphasised the association of this syndrome with a basophil adenoma of the pituitary gland, but Leyton, Turnbull, and Bratton have described a similar syndrome in the male in two cases in which carcinoma of the thymus was revealed at necropsy[1] and the pituitary, on serial section, appeared normal. At the Mayo Clinic seven cases of the syndrome have been collected and in a recent paper Kepler and his co-workers[2] present the results of their investigation. In two examples the pituitary gland is implicated. A basophil adenoma was found at necropsy in one, and in the other patient (who is still alive) there is radiographic evidence of enlargement of the sella turcica and erosion of the posterior clinoid processes. In a third example a thymoma was revealed at necropsy, while in the remaining four cases disease of the suprarenal bodies seems to have been the cause of the disturbance. In two of the latter class the responsibility of the suprarenal is clinically proved, because the surgical removal of a large cortical tumour has been followed by a rapid and dramatic reversion to a normal clinical state; and the photographs show that these claims are by no means overstated. In view of this and of the fact that a marked hyperplasia of the suprarenal cortex has also been observed in association both with basophil adenomas of the pituitary and with three recorded examples of the syndrome in carcinoma of the thymus, the question arises whether the clinical disturbance may not be related essentially to an excess of cortical secretion. Conceivably also, as Kepler tentatively suggests, an over-activity of the suprarenal cortex may stimulate the basophil elements of the pituitary gland and so lead to the formation of an adenoma of these cells. The problem cannot easily be resolved in this way, however, because the suprarenal bodies have been recorded as normal in several cases in which a basophil adenoma has been associated with the full clinical manifestations of the syndrome. It is obvious that we are still a long way from understanding the factors at work.

A practical point emerges, however, from the above considerations. As we are unable at present to tell which of the endocrine glands should be incriminated in the presence of the syndrome there is a strong case for surgical exploration of the suprarenal bodies. If this should prove unrewarding a second line of attack lies in directing X ray treatment to the pituitary gland.

ECONOMICAL BUYING BY HOSPITALS

AT the end of 1931 the Public Health Congress appointed a committee to inquire into the possibilities of standardising hospital equipment.[1] The information on which it bases the report just issued was obtained from a questionnaire sent to nineteen representative voluntary hospitals, but the committee believe that had similar inquiries been made of the local authorities, at any rate the smaller of them, the answers would have shown an almost identical state of affairs. In brief, what was found was that there are in use too many varieties of the same article, differing only in non-essentials, the prices varying widely; that there is little evidence of expert buying; and that all known methods of purchase are employed from "retail" to "direct from manufacturer." It is a natural impulse, especially on the part of small hospitals, to buy locally and in relatively small quantities, and, on the whole, the smaller the hospital the higher the price it pays for certain commodities. This is especially noticeable in surgical materials—one hospital will sometimes pay more than double the figure charged to another. Bedsteads vary from £2 2*s.* 6*d.* to £4 15*s.* 6*d.*, each equally suitable; bedside lockers range from £1 5*s.* to £6. At all but one of the hospitals consulted the average price of a dressing trolley is £6 10*s.*; at the other one of the models cost £20 and another £17 18s. There is no standardisation in sheets, which vary from 3*s.* 3*d.* to 10*s.* 6*d.* each; pillow cases range between 7*s.* and 28*s.* the dozen. Stainless steel knives cost anything from 7*s.* 6*d.* to £1 15*s.* per dozen. One hospital actually has knives of a different finish on a hierarchical plan, running down from doctors, through nurses, ordinary patients, and private patients to domestic staff! A comparison between a large and a small general hospital showed astonishing variations, all in favour of the greater institution which bought by sample and contract, whereas the small one purchased by local tender or from manufacturers' lists. The London and the Surrey county councils provide some illuminating figures showing the difference between central and instructed buying and purchases by individual committees.

The moral of these and other figures is unmistakable. The small buyer is always at a disadvantage, since the retail market only is open to him, whereas centralised buying saves the retailers' and often the wholesalers' profits, since the manufacturer can sometimes sell in large bulk for a lower price than he quotes to the wholesale firm. The proof of the pudding is in the eating. The London County Council buys in bulk some surgical instruments and medical and surgical sundries at less than half of the retail price, and in every instance makes a substantial saving. These economies are due to a reduction in the number of types, which means standardisation with consequent reduction in manufacturing costs, and purchases in large quantities. Not mere cheapness is desired, but the most suitable article of standard form. The committee refuses to admit that it is necessary for a hospital to purchase locally from firms which support it. It is laid down as the duty of the buyer to purchase as cheaply and efficiently as possible, and that if he does otherwise he is failing in that duty. That this will be the view of the general public, from which the voluntary hospitals derive most of their support, there can be no doubt whatever, and the committee believes that most of the hospitals favour the idea of simplification and standardisation, "but no one appears willing to shoulder the responsibility for the preliminary steps." The subject is admittedly delicate. Many medical men fear that standardisation might "stereotype professional practice and hamper or destroy individual initiative," or that a hospital authority might cut down expenses to a point that would stifle all growth and development. The committee have seen a real danger, but believe that the width of the field should enable it to be avoided. After all, no surgeon is likely to object to his bandages, provided they are of good quality, being bought by wholesale at half the old price.

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[1] Dr. O. Leyton recalled these cases, with illustrations, in his Schorstein lecture on "multiglandular disease" lately published in THE LANCET (1934, i., 1221).

[2] Kepler, E. J., Kennedy, R. J. L., Davis, A.C., Walters, W., and Wilder, R. M.: Proc. Staff Meet., Mayo Clinic, 1934, ix., 169.

[1] The chairman was Prof. W. W. Jameson, dean of the London School of Hygiene; Dr. T. Carnwath represented the Ministry of Health, Dr. Charles Porter the Society of Medical Officers of Health, and Mr. R. H. P. Orde the British Hospitals Association, and to them were added two technical representatives of the London County Council, a body which has already accomplished great things in the way of the simplification and standardisation.

The establishment of one central buying organisation for all hospitals is considered to be out of the question at this stage by reason of the cost that would be incurred before the value of the scheme could be proved. Much, however, could be done gradually and without delay by the grouping of hospitals with a view to simplification and profitable coöperation in purchasing. Meanwhile it is recognised that there is need for "a central bureau where views could be exchanged, standard types exhibited, and advice given to hospital officials." These are, indeed, the objects aimed at by the medical section of British Industries House, opened last week by Lord Derby, which seeks to become "a national buying centre for hospitals and the medical profession." Much may, perhaps, depend upon the development of this enterprise.

THE CONJUNCTIVAL CIRCULATION

Mr. Basil Graves's slit-lamp study[1] of the minute anatomy of the conjunctival vessels is the fruit of laborious years. In many persons, he finds, distinct vessels can easily be seen running more or less radially and conveying blood centrifugally towards the limbus where they turn deep in an arched course and join the episcleral vessels at the base of the limbus net or even the loops of the net itself. Accompanying many of these conjunctival vessels in which the direction of the blood stream is towards the limbus, are vessels so minute that they can easily be overlooked, in which the blood flows in the other direction, away from the limbus, and these two vessels form a loop somewhere between the limbus and the fornix. Similarly looped pairs of vessels arise from the fornix and proceed towards the region midway between fornix and limbus, where there is a fine anastomosis. Other shorter ones are in the limbus plexus itself. In one type a single relatively large vessel along the corneal border of the plexus conveys blood in one direction concentric with the limbus. On each side of the vessel there may be loops, but in normal conditions they are empty of blood, filling up readily under any circumstances which increase the superficial vascularity of the eye. At first sight the appearance of the vascular plexus at the limbus is that it is venous. Mr. Graves suggests that the efferent components of these conjunctival loops, where the rate of flow is slow, have become specialised to facilitate oxygenation of the blood and that they function as capillaries. Drawings made from actual cases illustrate the complicated connexions of the vessels.

The clinical bearing of these minute observations is not immediately apparent, but they are obviously related to the nutrition of the cornea. The paper will be a firm basis for future workers on this subject.

"SPINAL ANALGESIA IN FACT AND FANCY"

Nobody conversant with the facts has any doubt of the great value of spinal injections for analgesia. This value, however, is often obscured by failures with the method, and still more perhaps by explanations of the failures. The fact is that most failures are not to be attributed to the method but to the way in which it is employed. The same is largely true of fatalities that occur from spinal injections, and Dr. W. W. Babcock,[1] whose experience is almost unrivalled, puts the matter correctly as well as tersely when he writes: "After a death from spinal anæsthesia the anæsthetist may often properly write his own name in the space on the certificate reserved for 'cause of death.'" Babcock's article, though chiefly one of destructive criticism, is a useful addition to what has been written about spinal analgesia. It shows plainly the faultiness of much which is often accepted as true principle on which to employ the method, and it shows also, what cannot be too firmly or too constantly grasped, that success and safety depend on attention to details of technique. There is no need for great elaboration or for much use of adjuvant drugs. The anæsthetist who applies the lessons of physiology and anatomy with care and with common sense can hope for success as little tinged with anxiety as that which follows the practice of Dr. Babcock himself.

CO-OPERATION IN MEDICAL EDUCATION

It is a fact of public importance that the Governing Bodies of St. Bartholomew's Hospital Medical College St. Thomas's Hospital Medical School and Guy's Hospital Medical School have decided to establish a closer co-operation for the advancement of medical education. We have received the following from the Deans of these three important medical schools.

"The medical schools of London have grown rapidly during the last century and a half. They originated in a system of apprenticeship, under which the students became attached to individual members of the staffs of the various hospitals. Later this system was terminated and organised schools were established. Early in the present century these schools became constituent colleges of the University of London.

The range of medical education has now become so wide and the subjects included in the training of a doctor so complex that the problems of the teachers are becoming more and more difficult. It is to meet this difficulty that the co-operation between the three schools mentioned has come about. The first steps must necessarily be slow. An Executive Council has been formed, consisting of the Dean and four other members of the teaching staff of each school. Meetings, at which subjects of educational importance will be discussed, will be held throughout the year. The decisions reached will be referred to each school for consideration and such action as may be agreed. In order that the co-operation may be as close as possible the Dean of each school will be invited to attend the Council Meetings of the other two schools, when subjects of general interest are being reviewed.

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[1] Brit. Jour. Ophthalmol., June and July, 1934.

[1] Surg., Gyn., and Obst., July, 1934, p. 94.

A further step has been taken. Certain courses of study are being organised for which it is difficult to cater in an individual school, but which can be arranged without difficulty when the students of more than one school will benefit. Further, the students of each school will be permitted, under an arranged scheme, to avail themselves of the clinical facilities of the other schools. In order to allow the scheme to develop gradually, in some instances the arrangements for an interchange of clinical teaching will be restricted for an initial period to St. Bartholomew's and St. Thomas's. When, after some preliminary experience, the organisation has become stabilised, similar facilities will be extended to students of Guy's.

It is hoped that co-operation on these lines will be of great value to the cause of medical education, and it is felt that the wider outlook thus made possible for the students must be of real benefit to them.

BRITAIN AND DANGEROUS DRUGS

THE report for the year 1933 on opium and other dangerous drugs furnished to the League of Nations on behalf of His Majesty's Government is both interesting and reassuring. By new regulations and an order in Council under the Dangerous Drugs Acts (1920–1932), codeine and dionin are now brought under control as regards their manufacture and distribution in this country, as well as their import and export. The assurance is again repeated that "drug addiction is not prevalent in Great Britain," and no raw opium, coca leaves, or Indian hemp are produced in these islands. Five firms—three in London, one in Liverpool and one in Edinburgh—are licensed for the manufacture of medicinal opium, two are licensed to produce morphine and one to manufacture cocaine and its salts. The gross amount of morphine (alkaloid) made in 1933 was 30,757 oz., and of morphine salts 44,169 oz. Illicit traffic in narcotics, which has flourished in certain parts of the Continent, in the Levant and in the Far East, is said to be almost non-existent in Great Britain. No important seizures were made during 1933, "nor are there any indications of illicit traffic on any appreciable scale or of the organisation of illicit traffic in Great Britain." A Spanish subject, on arriving at Southampton from Havre, was found to be in possession of 140 lb. of opium, obtained apparently from a well-known trafficker in narcotics in Hamburg, who had fled thither when released on bail in America. He, according to the latest reports, was awaiting trial in Hamburg in connection with traffic in narcotics and other charges. The amount of codeine manufactured in Great Britain in 1933 was 35,890 oz. and 23,366 oz. were exported direct by the manufacturers. There were, during the year, 55 prosecutions under the Dangerous Drugs Acts, and in all but four cases fines from £5 to £100 were inflicted, and in 14 cases imprisonment of from one to 12 months was ordered. The total importation of raw opium in 1933 amounted to 129,635 lb., the bulk of it being of Turkish origin; of coca leaves 112,509 lb. were imported, mainly from the Netherland East Indies. The total exports of morphine and its salts were 16,156 oz. or 44 oz. less than in 1932.

KEITH LUCAS

GREATNESS is a quality difficult to define without the use of negatives. It is not synonymous with brilliance nor with a distinguished career; simplicity is its keynote, and simplicity as a positive attribute is given to few. The little collection of tributes to the memory of Keith Lucas, recently published,[1] reveals this as his outstanding characteristic. In such widely different spheres as home, school, scientific exploration, physiological research, aeronautical investigation, and military life we see it emerge unfailingly. Difficulties, mechanical, biological, and human, seem to dissolve at his touch, and the courage of his convictions is ever present. Although physiology cannot claim all the fruits of his labours, its debt to him is profound—not only for his characteristically fundamental contributions to its knowledge, but for his spirit and influence. If any proof of this were necessary, the very publication of this volume at the present time would be sufficient. The cynically minded might say that 18 years after his death is a most unpropitious moment for producing biographical notes of any man, but in this case they would be wrong The papers have been written by several persons, each of whom knew him for some period of his life, and their story is told with a simple unemotional directness whose object is not to make a hero, but to pass on to those whom the war deprived of Lucas's acquaintance something of his fearless insight and generous spirit. To the late Sir Walter Fletcher we owe the conception of this memoir, most of the material for which he himself had collected, and there can be little doubt that the completion of none of his unfinished tasks would have given him greater pleasure than this.

SULPHUR IN RHEUMATOID ARTHRITIS

SULPHUR metabolism in arthritis was the subject of two communications to the international congress on rheumatism, recently held at Aix-les-Bains (see THE LANCET, July 14th, p. 111). Prof. M. Loeper and his co-workers, who have estimated the sulphur content of synovial fluid, cartilage, and blood, reported a deficiency in the joint tissues, with an excess of total sulphur and of glutathione in the blood. Dr. A. R. Neligan described a study made with H. B. Salt at the Royal Brine Baths Clinic, Droitwich, of the essential sulphur-containing amino-acid cystine in the finger-nails in arthritis. M. X. Sullivan and W. C. Hess,[2] of Washington, have observed a decrease in arthritis in general, and the Droitwich workers, using the same methods but studying cases of rheumatoid arthritis only, found an even more marked difference. For normal persons the average was 12·12 per cent.; for rheumatoid arthritis it was 7·78 per cent., and 75 per cent. of the rheumatoid cases were below the average normal figure. They also examined cases of non-rheumatic chronic disease and found that the nail cystine was low in them too (average 8·91 per cent.). They suggest that if the physiological importance of an organ may be judged by its sulphur content, the cutaneous system ranks higher than all, and ask whether it acts merely as a reservoir or has a more active rôle. The importance of the skin in rheumatic conditions is recognised; but the decrease of nail cystine appears to be a concomitant of chronic illness in general, and not of arthritis in particular. Nevertheless, the closer study of sulphur metabolism in chronic disease may help to a better understanding of its ætiology and of why sulphur does good in some forms of rheumatism.

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[1] Keith Lucas. Cambridge: W. Heffer and Sons, Ltd. 1934. Pp. 131. 5s.

[2] Jour. Bone and Joint Surg., 1934, xvi., 185.

THE DECLINE OF THE FLEA

THE numbers of all animals are subject from time to time to wide fluctuations, due sometimes to causes that are well understood, sometimes to factors that are quite obscure. A few years ago certain German newspapers announced that the human flea was extinct; and although this claim was promptly negatived by the offer of large numbers of highly priced fleas to the curators of museums, there can be little doubt that in recent years the human flea population has fallen. Fleas are less in evidence to the ordinary observer; they are more difficult to obtain for zoological laboratories; and the managers of performing fleas, who ordinarily draw their supplies from the poorer sorts of lodging-houses, in spite of paying as much as half a crown a dozen for "good bold fleas," have been hard put to it to recruit their circuses. The reasons for this decrease are not altogether clear, but there seems to be no ground for the belief that it is the result of some epizoötic disease of the flea. Some German authors have credited the change to the altered habits of dress among women; notably the disappearance of heavy woollen clothing and stockings in which fleas were formerly wont to hide. The flea, of course, is far more readily discouraged by general domestic cleanliness than is its fellow the bug; and any improvement in this direction will be at once reflected in the flea population. Then the early stages of the flea are ill-adapted to withstand desiccation; it is well known that in many parts of the tropics and sub-tropics the disappearance of bubonic plague during the hot, dry season is brought about by the fall in the rat-flea population; and it is not inconceivable that the climate of the last two summers may have proved inimical to the human flea. Probably all these and other factors have been concerned. Certainly the flea population seems to be less than it was; and those who require the human flea in quantity can often obtain it most readily, sometimes indeed in enormous numbers, from pigsties. For, like many of his other parasites, man shares his flea with the domestic pig.

PHARMACOPŒIAS PRESENT AND TO COME

FOR the second year in succession Dr. C. H. Hampshire presided over the British Pharmaceutical Conference, which met at Leeds last week. He is the secretary of the Pharmacopœia Commission, and this may be partly the reason why so many of the contributions were closely concerned with progress in the science on which pharmacy rests. The theme of his own address was pharmacopœias—British and foreign, old and modern. Beginning with the first, issued in 1618, he showed how stage by stage changes were introduced until there emerged a work which has little or no resemblance to that produced by the Royal College of Physicians of London more than three hundred years ago. We now have a book of standards instead of a catalogue of drugs and a multitude of prescriptions. Little of Dr. Hampshire's address, however, was devoted to ancient history. Turning to our own times he recalled that since 1928 seven national pharmacopœias, besides our own, have been published, three of them (the Italian, Belgian and Spanish) before the British, and four (the Danish, Swiss, Yugoslavian and Hungarian) after it. The Spanish pharmacopœia, he said, is one of the most satisfying and instructive of the modern pharmacopœias and in close relation to medical advances; the Swiss book is of great value from the pharmaceutical point of view; the Yugoslavian official volume shows the same infusion of the modern spirit, as also does the Hungarian. The Italian pharmacopœia does not include physiological methods of assay, but like the Belgian and Spanish volumes, contains a much larger number of monographs than the British. The Danish book is distinctly a pharmaceutical pharmacopœia with a preference for formulas; organotherapeutic remedies and organic arsenical compounds are not included, the reason given for the omission being that the methods of preparation and standardisation of these drugs are rapidly developing and the requirements of the pharmacopœia are intended to apply over a number of years.

There is a pharmacopœia which many besides Dr. Hampshire would like to see—an international pharmacopœia. Such an undertaking has long been projected, but an impasse seems to have been reached. The desire is as keen as ever for the unification of the standards for drugs and of the strengths and formulas of preparations through a universal volume. Differences in national standards for widely used medicinal substances are a hindrance to the spread of medical knowledge and a bugbear to pharmacists who have to dispense prescriptions brought by travellers from various countries. An international pharmacopœia would remove those difficulties, and it is to be hoped that some day Dr. Hampshire will himself have the pleasure of presenting it to the British Pharmaceutical Conference as an accomplished fact.

THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

THE new building of the Royal Australasian College of Surgeons will be opened in Melbourne by the President of the Royal College of Surgeons of England, Sir Holburt Waring, on Monday, March 4th, 1935, and it is anticipated that a number of distinguished surgeons from England and Canada will attend this meeting, amongst whom are included Dean Lewis, D. C. Balfour, Prof. C. F. Saint, Sir William I. de Courcy Wheeler. Sir D'Arcy Power, and Prof. Edward Archibald, of Montreal, are also expected to be present. It was originally intended to hold the annual general meeting of the College at the same time as the opening ceremony, coincidental with the British Medical Association meeting in Melbourne, but this arrangement unfortunately could not be effected.

On Wednesday of last week, at a graduation ceremonial held in the McEwan Hall, Edinburgh, the Cameron prize in practical therapeutics was presented to Sir Edward Sharpey Schafer.

Lord Woolavington has given £10,000 towards the cost of establishing pay-beds, for patients of moderate means, at the London Hospital. He is also the donor of the Woolavington wing for paying patients at the Middlesex Hospital, to which he has made many large gifts.

INDEX TO "THE LANCET," VOL. I., 1934.

THE Index and Title-page to Vol. I., 1934, which was completed with the issue of June 30th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XII.—PERFORATING INJURIES OF THE EYE *

A PERFORATING injury of the eye may be caused either by a sharp instrument penetrating the wall of the globe in some position, but without being retained, or by a smaller agent (foreign body—e.g., iron, steel, copper, glass fragment) which, passing with force through the wall, is retained in the eye or may indeed pass completely through the globe and come to lie behind it in the orbit. In considering prognosis it is better to take these two types of injury separately, although there are certainly two main factors which govern both. The first of these is the severity of the injury, for in either type this may be so severe that it is apparent to the least experienced observer that the eye is irretrievably damaged and should be either enucleated or perhaps eviscerated at once. When the injury is less severe and there is a reasonable prospect of the eye being saved, the second main factor is the occurrence of sepsis.

The severe injury necessitating immediate removal of the eye is relatively uncommon, certainly as compared with the occurrence of sepsis in the less severe cases, but these two causes together constitute the chief determining factors in the loss of a wounded eye. There do not appear to be any statistics available which show the proportion of eyes so lost, except in the cases where a foreign body has been retained in the globe. I have found that practically two out of every five eyes injured in this way require enucleation; the actual figures being 424 enucleations in 1117 cases of intra-ocular foreign body under different observers. It is more than likely that this estimate is applicable to both types of penetrating injury.

Sepsis.—When sepsis occurs early and is acute panophthalmitis develops and there is no question as to the fate of the eye—namely, enucleation—but when the sepsis is of a low grade type coming on late, a week or much longer after the injury, or even years after, from late infection of the scar, much anxiety may be felt as to whether it is safe to advise retention of such an eye. As a rule an eye which shows uveitis following the trauma goes steadily downhill with gradual loss of vision and atrophy of the globe, and the patient will be saved much suffering if enucleation is performed early. When this has been postponed for some time, say two or three months, in the hope that the eye may recover, there is often headache long after the eye has been removed. This should be borne in mind in cases under the Workmen's Compensation Act, where for months after the removal of the injured eye the patient may say he is unable to work on account of headache, the existence of which it is difficult to prove or disprove. Since, however, cases in which enucleation has been performed early are rarely followed by headache, the complaint is probably genuine and is attributable to ciliary neuritis.

Sympathetic ophthalmia.—The chief danger, however, in keeping such an infected eye lies in the possibility of the development of sympathetic ophthalmia, and this is in contradistinction to the cases of panophthalmitis where the occurrence of sympathetic trouble is very rare. The site of the wound in the eye and the age of the patient are both factors which must be taken into account, especially the former. For example, it has long been recognised that the most dangerous site for a wound is the ciliary region and its immediate neighbourhood; but, on the other hand, an eye wounded in any position must, if irido-cyclitis has set in, be regarded as suspect and may be followed by sympathetic trouble in the other eye. The force of this will be better recognised when it is remembered that sympathetic ophthalmitis may be the sequela of either a cataract extraction or a hypopyon ulcer of the cornea. The shortest recorded interval between the injury and the onset of sympathetic ophthalmia is ten days and the longest about 48 years, so that the patient with a suspect eye, though he may feel that its retention is a clever piece of conservative work, is actually exposed to the risk of trouble for the rest of his life. The age of the patient is of importance, for children and young people are more prone to develop sympathetic ophthalmia than adults.

Should sympathetic ophthalmitis set in, what is the outlook for the patient? A good idea of the answer to this question can be gathered from the general agreement that it is wiser, once sympathetic trouble has started, not to enucleate the exciting eye, since this may prove in the end to be the only one in which any sight is retained. Although there are records of cases in which useful sight has been restored by various methods of treatment, the prognosis is definitely bad; and the disaster is the more deplorable when it is realised that had enucleation of the exciting eye been performed sufficiently early—i.e., within two weeks of the accident—it would never have occurred.

To sum up the foregoing one may say that the outlook for an eye that has received a perforating injury, either with or without retention of a foreign body, but followed by uveitis, is bad for the eye itself; and it is moreover a source of danger to its fellow, especially if the wound is in the ciliary region and the patient is young.

THE OUTLOOK WHEN NO FOREIGN BODY IS PRESENT

In the absence of sepsis where no foreign body is present in the globe the future of the eye depends largely on the site of the wound, and, broadly speaking, when the injury is confined to the anterior portion of the eye and concerns only the structures which lie in front of the hyaloid membrane, the ultimate outlook for the eye, both as regards vision and retention, is better than if the vitreous has been damaged.

Taking the various structures which may be wounded separately we have:—

The cornea.—Here prognosis depends entirely on the site and size of the injury; a small perforation with little or no destruction of tissue heals rapidly, and if situated away from the centre of the cornea vision is not interfered with. If the wound is larger, the iris may adhere to the posterior lips of the wound or prolapse through it, a condition which if not dealt with will jeopardise the future of the eye. When there is much destruction of corneal tissue a staphylomatous condition of the cornea may follow, leading later to loss of the eye. Reduction of vision in corneal injuries depends upon the density of the scar and its position—i.e., if in the central part of the cornea.

The iris.—A wound of the iris, per se and without complications, is not a serious matter, vision not being materially affected, but, as just stated, there may be adherence of the iris to the corneal wound which is inevitably present or a prolapse of this structure through it, and if this is not dealt with the eye may remain irritable for a long time or late infection may occur leading to ultimate loss of the eye.

The lens.—A wound of the lens almost invariably means a traumatic cataract; occasionally the capsular opening will close over and beyond a small opacity in the immediate neighbourhood nothing further will happen, but as a rule complete opacification occurs. In a young person absorption of the lens matter takes place without complications, but in older people an increase of tension is liable to supervene, necessitating surgical assistance; but provided this is well carried out no detriment follows. The outlook for the aphakic eye itself is by no means bad, for with a suitable correcting lens good vision may result, but its owner will have lost binocular vision, and is in the position of a one-eyed man, with one important and favourable difference: he retains a potential eye to be brought into action should anything happen to the good uninjured eye; moreover, the aphakic eye is of some value in seeing objects on its own side, although even dimly.

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* This article was received on June 27th, only two days before the author's untimely death.

In one of my cases it was thought worth while to extract a traumatic cataract in an eye injured many years previously; the patient was a stud-groom and expressed himself delighted with the result, for, he said, "I can now see my led horse," although the correcting lens was worn.

The sclera.—Wounds of this structure are so frequently associated with injury to the ciliary body or choroid, together with the retina and more or less loss of the vitreous, that all these structures may be taken together and grouped as forming the injuries of the posterior chamber of the eye.

It is here more than probable that loss or disturbance of vitreous is the chief factor in determining the future outlook for the eye; it has been estimated on good authority that *if one-fifth of the vitreous is lost no vision may be expected.* Even if little or no loss takes place there will be scarring of the vitreous, which tends to lead later to retinal detachment and corresponding destruction of vision. Further, it can be easily understood that if vitreous loss occurs the retina and choroid are wounded and tend to atrophy later, with corresponding loss of field vision.

Speaking generally, one may say that some deterioration of vision, either central or peripheral or both, is the inevitable sequela of any perforating injury of the posterior chamber of the eye, and that it is greater or less according to the severity of the injury.

THE OUTLOOK IN THE PRESENCE OF A FOREIGN BODY

When a foreign body has penetrated and remains in the eye, the *site* of the foreign body is the most important factor in the prognosis.

If it lies *in the anterior portion of the globe*—i.e., in any part anterior to the hyaloid membrane but excluding the ciliary body—extraction is a comparatively simple matter and good results follow, even though the iris may be injured. The lens may, of course, be concerned and a traumatic cataract may follow, but this, if dealt with satisfactorily, should only mean an aphakic eye. Speaking generally, the outlook for an eye in which a foreign body has come to rest in its anterior portion is distinctly good, provided appropriate surgical measures have been carried out.

It is otherwise, however, when a foreign body has penetrated deeper and lies *in the vitreous* or against or even impacted *in the posterior wall of the globe,* and it is unfortunate for the patient that this is the commonest site for the foreign body to take up.

I have found and noted in the Transactions of the Ophthalmological Society of the United Kingdom (liii., p. 438), that in 374 out of 656 cases recorded by observers in this and other countries the foreign body lay in the vitreous—i.e., 57·7 per cent., and, further, that the percentage of enucleations in vitreous cases was 45·9. This appears to suggest that when a foreign body lies in its most favourite site in the globe, nearly half the cases come to enucleation. What is the outlook for the remaining 54·1 per cent. of cases where the eye has been "saved"? In a number of them the results may seem to be very satisfactory at first, to the gratification of both patient and surgeon, but as time goes on this number diminishes, and the end-results seen years after the original injury are distinctly disappointing.

With a view to ultimate prognosis in cases of this kind—i.e., foreign bodies in the vitreous or impacted in the posterior wall of the globe—I collected last year from the literature of this and other countries in addition to those under my own observation 88 cases which had been re-examined more than five years after the original injury.

In all these cases the foreign body was iron or steel and therefore responsive in most instances to the giant magnet.

Considering the importance of the subject, at least in industrial districts, together with the wide range of literature examined, the number under review may seem small as a basis for definite conclusions. Records of late examinations are, however, scanty, and only those cases were included of which full and reliable information had been available. Of the 88 cases, many of which had been re-examined at periods considerably longer than 5 years, even up to 21 years, 19 were examples of retained foreign body impacted in the wall of the globe, whilst 69 were examples in which the foreign body had been successfully removed. The visual results were classified in three grades as follows: (1) useless eyes—i.e., eyes rendered blind or with vision not better than 3/60; (2) useful eyes—vision from 3/60 to 6/12; (3) good eyes—vision from 6/9 to 6/6 or better, with results as follows:—

Eyes.	Impacted cases (19).	Successful removals (69).
	Number and percentage.	
Useless	11 (58·5)	41 (59·4)
Useful	6 (31·5)	18 (26·0)
Good	2 (10·5)	10 (14·4)

From these figures it will be seen that the chances of an eye being blind in impacted cases where the foreign body is left in situ as compared with its removal are about equal; that there is a rather better chance of a useful eye being retained in impaction than if the foreign body is extracted; but that the chance of obtaining a good eye is nearly 3 to 2 if the foreign body is removed.

It must be remembered that *siderosis* may have to be reckoned with when the foreign body is retained and cannot be removed except at the cost of considerable damage to the eye; but siderosis, though causing grave disturbance in an eye, does not always mean its loss. An eye may show marked signs of this interesting condition and yet after removal of the foreign body may prove a useful organ and cause no further trouble. If the foreign body cannot be removed, but is small, it may become absorbed and the signs of siderosis gradually subside. The prognosis in cases where the retained foreign body is copper or brass is not good for the eye. It may be possible to extract from the anterior portion of the globe a fragment of this nature, but it is practically impossible to rescue it from the posterior chamber.

Cases are on record where copper has been retained in the globe for years, but usually owing to chemical changes taking place the condition known as *chalcosis* is set up, just as is siderosis in the case of iron fragments, and the eye comes to enucleation.

Fragments of glass or stone may be retained in the eye for many years without causing trouble, for chemical changes are not set up by their presence. The outlook, however, cannot be said to be favourable, especially when the site of retention is in the posterior chamber of the globe.

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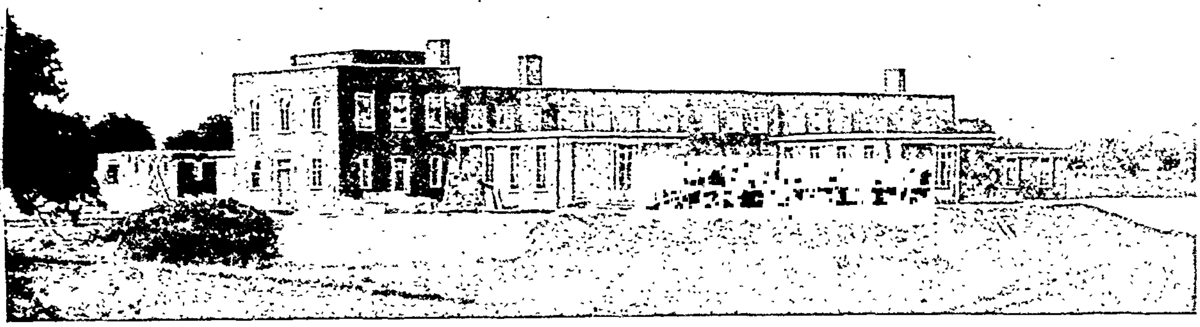
SPECIAL ARTICLES



THE NEW HOSPITAL AT WELWYN, JUST BEFORE COMPLETION

A LARGE COTTAGE HOSPITAL

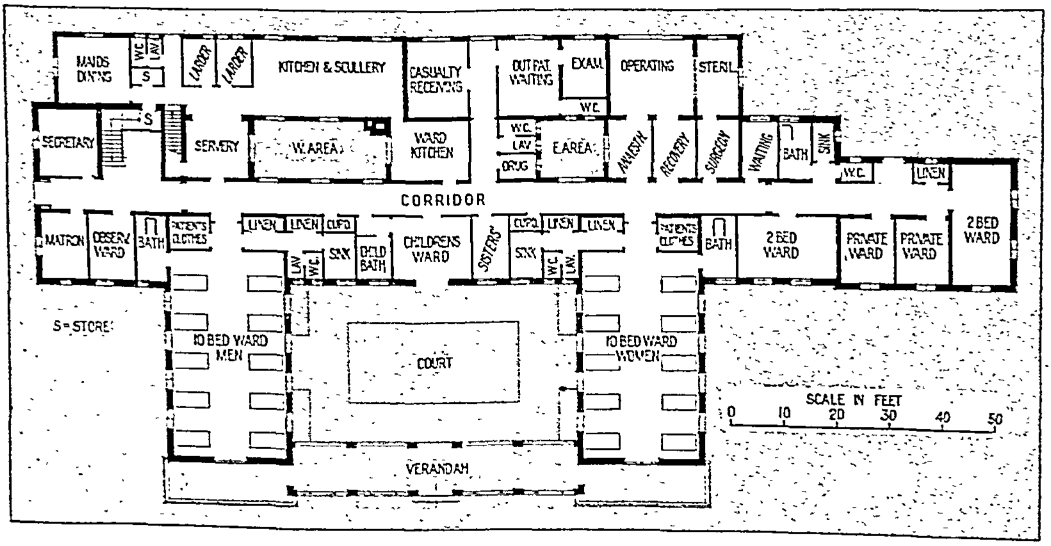
On July 24th the Duchess of York opened the new buildings of the Queen Victoria Memorial Hospital at Welwyn, Herts. The hospital was founded in 1902 with four beds and until the present time has been housed in the original building on the main Hitchin–Welwyn road, to which additions were made from time to time. The population of the district is increasing and it was being found that 12 beds were insufficient for its needs, when a bequest of £25,000 in the will of the late Sir Otto Beit enabled the committee to acquire a site of about five acres and erect a new hospital. The site is admirably adapted to its purpose, standing just outside Welwyn, high on a southern slope above a quiet lane and with wide views towards the west, east, and south. The design is by Mr. H. G. Cherry, F.R.I.B.A., working in close coöperation with Messrs. Adams, Holden and Pearson as consulting architects.

The building erected provides for 30 beds. The elevations are horizontal in character with a flat roof, and the windows, which are of metal in wood frames, have horizontal bars. It is faced in red bricks from Daneshill with dark purple quoins to window and door openings.

The main entrance, with hall and staircase to the first floor, is at the west end and is approached by a curved drive up from the road. The main corridor runs approximately east and west with a duct beneath it for pipe runs. On the northern side of the corridor are the kitchen and servants' quarters with a tradesmen's entrance in the rear the out-patients' and casualty department, and the operating suite, which is equipped with Messrs. James Slater's electric sterilisers and one gas-heated dressing steriliser. At the eastern end of the corridor a swing door leads through to the private patients' wing containing two single and two 2-bed wards. South of the corridor are two projecting 10-bed wards, one for men and one for women with a small ward for children in the centre. Large french windows at the end of each lead to the loggia for the use of patients which forms the southern boundary of the paved garden lying between the wards. The sluice-rooms and bathrooms are planned at the corridor end of the wards with direct access through a ventilated lobby.

On the first floor are a small flat for the use of the matron, the nurses' sitting-room, dining-room, and 12 nurses' bedrooms fitted with hot and cold water and so placed that they are not directly over the wards. Half-way down the corridor are a group of bathrooms and the servants' wing which is equipped with bathroom and lavatory; at the far end are quarters for night nurses, shut off by a door to ensure quiet.

The floors in the wards are of Rhodesian teak, and



PLAN OF THE GROUND FLOOR

those in the nurses' bedrooms and the sitting rooms are of jarrah. The furniture throughout the hospital is mostly of limed oak of pleasant design and colour. The tiled kitchen has a large double Esse cooker, a B.T.H. refrigerator, and a Hot-lock trolley for carrying food to wards. Wireless is laid on with headphones for each patient and also for the staff.

The ambulance garage is behind the hospital with the store rooms and a small, well-equipped laundry and drying room. In the north-western corner of the garden there is a small mortuary with a central door in front which leads into the mortuary chapel. At the side of the buildings are doors leading to the post-mortem and store room.

There is no X ray department in the hospital; an arrangement is being made with the Portable X-Rays Ltd., Chiswick, for regular service as well as emergency work.

The honorary medical staff of the hospital consists of eight local practitioners and six London specialists, also a dental surgeon and a masseuse.

INTERNATIONAL RADIOLOGY

THE fourth International Congress of Radiology, now in progress at Zurich and St. Moritz, has an interesting and comprehensive programme. The president is Prof. H. R. Schinz, and the delegates come from 30 nations. At the opening meeting on Wednesday of this week, Prof. Gösta Forssell speaks on Principles in the Fight against Cancer, and representatives of the various nations report on the organisation of the campaign in their own countries. Thereafter, every day, there are two "general reports" on special subjects, while six sections meet to discuss such different subjects as radiographic technique, the use of the cinematograph in rontgen diagnosis, radiotherapy at 700 kilovolts, and the action of ultra-short Hertzian waves.

Prof. Kienbock, of Vienna, opens the discussion on the diagnosis of tumours of bone, and Prof. Herrnheiser of Prague that on radiodiagnosis of pulmonary tuberculosis. Therapy is particularly well represented, the subjects for discussion being the radiation treatment of cancer of the uterus, and of malignant tumours of the mouth and pharynx. The openers are Dr. A. Lacassagne of Paris and Prof. F. Perussia of Milan, and among those taking part are such well-known men as Prof. Regaud, director of the Fondation Curie, and Dr. E. Berven, director of Radiumhemmet. A new subject to many members is "radiation genetics," a subject of experimental investigation by American and German observers: Mutation of genes and chromosome rearrangement can be produced by radiation, and these may result in hereditary diminution of fertility. Also stimulating in its outlook is the paper on mitogenetic radiation by Dr. S. Salkind of Leningrad, who believes that there is a definite relationship between the biological effects of this form of radiation and the production of cancer.

From a discussion of identical physical measurements of the dose in X ray and radium treatment, it is hoped that definite guidance will be given to those engaged in such therapy throughout the world. At the third congress held in Paris a special committee was appointed to investigate this problem and to report to this meeting, and all who realise its fundamental importance are awaiting the verdict of the distinguished workers led by Prof. Holthusen of Hamburg. Dr. R. Sievert of Stockholm speaks on hard gamma rays, cosmic radiation and earth radiation, and a paper in this discussion will be given by Prof. Piccard of Brussels, famous for his stratosphere ascent, who takes for his subject the method of investigating radiations at a great height. The last general paper is on short wave therapy, another comparatively new subject which has many points of interest.

Besides these special meetings the six sections meet daily, and over 400 members are reading papers. In addition there is an international exhibition of apparatus, one of books, and a demonstration of the application of radiology to the investigation of materials and paintings. The opportunity of seeing the latest apparatus of European and American firms will be very welcome.

MEDICINE AND THE LAW

Christian Science Treatment of Intestinal Obstruction

THERE is seldom anything fresh to record at inquests upon the death of persons who have undergone treatment by Christian Science practitioners. Anyone who has attained years of discretion is perfectly entitled to call in any kind of assistance when he is sick, or no assistance at all. Where the patient is too young to look after himself, Section 1 of the Children and Young Persons Act (replacing Section 12 of the Children Act of 1908) makes it possible to punish the neglect of parents or guardians who omit to obtain necessary medical or surgical treatment. Otherwise, there is no law which compels the calling in of a doctor. Where a Christian Scientist has met his death, the coroner can ascertain the fact that proper medical or surgical treatment would have averted death. The coroner may or may not advise the jury to send for trial practitioners whose treatment appears to have accelerated or assured a fatal result. If he knows that no jury at assizes would find such practitioners guilty of manslaughter there is no point in his encouraging a coroner's jury to pronounce the verdict which will commit the practitioners for trial. The coroner is concerned to ascertain the cause of death not the religious convictions of the deceased. If the dead man and his family, believing that more things are wrought by prayer than this world dreams of, have relied on that belief to the exclusion of human aid and of accumulated knowledge, then the coroner and his jury may deplore the result but can only record what they find.

At a Southport inquest last week a man was found to have died of heart failure due to chronic toxæmia, the result of chronic intestinal obstruction caused by stricture. He became ill at Whitsuntide and consulted four women Christian Science practitioners, two from Southport, one from Manchester, and one from Rochdale. One of these, questioned by the coroner, said that prayer might cure a man who fell off a ladder and smashed both his thighs; prayer, she said, could cure a stricture. Dr. W. E. Cooke, pathologist to Wigan Infirmary, definitely stated that the lack of medical skill resulted directly in the death of the deceased. He would probably have been cured up to within a week of his death if a doctor had been called in. Dr. Cooke commented on the fact that the Christian Science practitioner who had allowed the patient's condition to continue to its fatal conclusion had been trained as a qualified nurse. The coroner, Sir Samuel Brighouse, trusted that the inquiry would convey to the public the mistaken nature of the treatment. He was saddened to think that his fellow-men believed that if someone broke a leg at Ormskirk someone in Southport could pray for him and thereby cure him. The jury expressed disgust and censure at the treatment of the deceased. The coroner observed that he would have advised them to send the Christian Science practitioners for trial if he had thought there was the slightest chance of their being convicted.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A CLEAN MILK BILL

THE long-expected Clean Milk Bill was introduced in the Dáil last week and has now been circulated. Without imposing any harsh restrictions on those engaged in the milk trade it appears to make provision for a fairly satisfactory control as far as the public health is concerned. The Minister is given power to prescribe by regulations the designations which may be used for milk sold or exposed for sale, and such prescribed designations shall be known as "special designations." Sale of milk under special designations will be limited to persons who have been granted licences for the purpose. Part III. of the Bill deals with the prevention of disease likely to be caused by infected milk, and the following such diseases are enumerated: tuberculosis, typhoid fever, paratyphoid fever, diphtheria, membranous croup, and scarlatina, together with such other diseases as the Minister may from time to time declare by order. Fresh powers are given to medical officers of health to aid them in investigating the source of disease which may be due to milk, and to prohibit the sale of milk from a particular dairy or of milk derived from a particular animal. The powers so conferred cover the examination not only of the dairy and the milk, but also of any person engaged in the service of the dairy, or resident in the dairy, or resident in any premises where any person employed in the dairy may reside. It is made an offence to sell milk which is infected with disease, if the dairyman knew or could by the exercise of ordinary care have ascertained that such milk was infected. It is also made an offence to sell milk to which an infected person has had access. Part IV. is concerned with the sale of milk from diseased cows. It is made an offence to sell milk from cows suffering from any of the following diseased conditions: tuberculosis of the bladder, any tuberculous condition of the uterus, any form of tuberculosis in which tubercle bacilli are excreted, any septic condition of the uterus, acute mastitis, chronic mastitis, actinomycosis of the udder, anthrax, foot-and-mouth disease, suppuration of the udder, retained placenta, and every other disease which may from time to time be declared by order. Various minor provisions in the Bill deal with the control of the conditions in which milk is produced and distributed.

HONORARY DEGREES AT THE NATIONAL UNIVERSITY OF IRELAND

Honorary degrees were conferred by the National University of Ireland last week on several members of the staff of the medical faculty of University College, Dublin, and on other distinguished graduates of the University, as follows:—

M.D.—Dr. E. P. McLoughlin, professor of anatomy and dean of the faculty of medicine, U.C.D.; Dr. J. N. Meenan, professor of systematic medicine, U.C.D.; Major W. R. O'Farrell, pathologist to the Mater Misericordiæ Hospital, Dublin; Dr. T. T. O'Farrell, professor of pathology and bacteriology, U.C.D.

M.Ch.—Mr. H. S. Meade, professor of systematic surgery, U.C.D.

M.A.O.—Dr. Robert P. Farnan, professor of midwifery and gynæcology, U.C.D.

The Chancellor of the University, Mr. Eamonn de Valera, presided, and tributes were paid to the work of each of the candidates by Dr. Denis J. Coffey, president of University College, Dublin.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE VILLEJUIF CANCER INSTITUTE

THE new cancer institute which Prof. Roussy has brought into being at Villejuif in the suburbs of Paris has now been inaugurated by the President of the Republic. Roussy began this undertaking a dozen years ago on a modest and tentative scale, increasing the number of beds from 10 to 50 in the course of the first few years. Now there are some 150 beds, and the institution, which is attached to the Paris faculty of medicine, has become a model of its kind. One of Roussy's guiding principles has been the inclusion, in a single unit, of clinical services and research laboratories. On the clinical side, the 150 beds are more or less equally distributed between the three services of radium, X rays, and surgery. The medical staff on this side alone numbers about 25. On the laboratory side, there are as many as six different departments—for experimental medicine, pathological anatomy, serology and bacteriology, cytobiology (tissue culture), general chemistry, and physical chemistry. Here there is a staff of about 20.

CONTROL OF ARTIFICIAL MALARIA

The dangers of infection from patients inoculated with malaria for the treatment of general paralysis have led to the appointment of a commission which has recently presented its report to the Academy of Medicine. The gist of its recommendations is that inoculation with malaria should be permissible only in approved centres, and that these should preferably be in urban areas where skilled assistance is available. Elsewhere they should be provided with netting fine enough to keep out the anopheles. It is also recommended that psychiatrists collaborate with a biologist who will alone be responsible for the inoculation of patients and the control of the malaria thus induced. Further, no patient thus treated should be discharged or transferred to another institution until his recovery from malaria has been demonstrated by clinical, microscopic, and serological examinations. The Academy has adopted this report, whose immediate presentation to the Minister of Public Health has been urged by its authors. It may be remembered that, as early as 1929, the Academy adopted somewhat similar recommendations, and its return to the charge on the present occasion indicates the fate of its earlier proposals.

FIRST AID BY THE PARIS FIRE BRIGADE

The remarkable efficiency of the first-aid service rendered by the Paris fire brigade is largely due to the initiative and capacity of Lieut.-Colonel Cot, who, in 1926, outlined his ambitious programme in the *Archives de Médecine et de Pharmacie Militaires.* The following figures speak for themselves. In 1930 the fire brigade rendered first aid to about 100 persons. In 1931 this figure rose to 230; in 1932 to 480; and in 1933 to about 800. The rapid improvement in the proportion of cases in which first aid was successful after gas poisoning, submersion, and electrocution was still more impressive. In 1928 this proportion was 50 per cent. In 1930 it rose to 65 per cent., and in 1932 to 85 per cent. These results have been achieved by the mastery by the members of the fire brigade of the technique of first aid to the class of case they have to deal with, and by the machinery devised for bringing these experts to their field of operation as promptly as possible. There are now four mobile first-aid units attached to the fire brigade. There are also three stations where "carbogene" containers can be recharged. (Carbogene is a mixture now produced commercially consisting of 95 parts of oxygen to 5 parts of carbon dioxide.) As soon as the first-aid services of the brigade are required, someone runs to the nearest alarm box, breaks the glass, and telephones to the station of the district involved. A motor-car manned by eight men sets out promptly, its outfit including an apparatus for artificial respiration and a carbogene inhaler provided with two cylinders with a capacity of 300 litres of this mixture under a pressure of 150 kg. The first aid rendered varies, of course, with the cause of the accident (asphyxia, electrocution, &c.). The medical officer on duty promptly follows his team in another motor-car in which, in addition to the outfit already mentioned, there is a medicine chest provided with drugs, dressings, and splints. Arrived at his destination, he receives the report of the leader of his team, makes a rapid clinical examination of the patient, and sees that the treatment he receives is the best. It is the pace that saves.

MORE B C G STATISTICS

On June 5th Prof. Léon Bernard, on behalf of Dr. Guérin, presented to the Academy of Medicine statistics dealing with Mulhouse and 26 neighbouring communities in which, during 1933, 2036 infants were born. B C G was given to 1267 of them (62 per cent.). The deaths during the first year of life numbered 16 for the controls and 12 for the B C G babies, the respective death-rates being 2·15 and 0·94 per cent. In another conglomeration of 28 communities, over 80 per cent. of the 708 new-born infants—i.e., 527—were given B C G. In the first year of life there were 9 deaths among the non-vaccinated controls and 19 among the B C G babies, the death-rate for the former being 7·43 per cent. and for the latter only 3·35 per cent.

VIENNA

(FROM OUR OWN CORRESPONDENT)

JEWISH DOCTORS IN AUSTRIA

THE economic crisis, together with political unrest and the sad example set by Germany, has changed the situation of a large proportion of the medical profession in this country. Hitherto, out of about 7800 medical men and women, some 7100 have lived and worked in Vienna, with its population of 1,800,000. The peculiarity of the profession in Vienna has been that about half its members were of Jewish race or extraction, whereas in the provinces the proportion of Jewish doctors was not more than 5·8 per cent. This is explained by the fact that out of the 250,000 Jews in Austria 200,000 live in Vienna. As they have been almost debarred (not by law, but by custom) from appointments in the civil service, the municipalities, the post office and the railways—in fact, from public service—their intellectual members have had to turn to medicine, the Bar, journalism and commerce. Especially in Vienna the first two vocations have been followed chiefly by Jewish students—not to the detriment of the professions concerned. Now, since democracy has been done away with, and the racial or religious aspect has been given overwhelming importance in all affairs pertaining to economic problems—for we must clearly understand that all this political unrest is simply a matter of "give us our daily bread"—a silent, secret, but relentless battle is being waged by the circles at present ruling this country against what they call "not national people," the Jews. (Incidentally, Jews have been here in large numbers for at least 700 years.) As regards medicine, all Jews holding any appointments, even of a minor character, in the hospitals, asylums, school clinics and laboratories, are more or less gently eliminated; if their term of service expires, it is not renewed; no new appointment is given to a Jew. The same holds good in panel practice or the Krankenkassen: they are dismissed, with or without pension, as the case may be. A very serious matter is that the training of the would-be specialist, as well as of the ordinary practitioner who has not served his term, is completely at a standstill if he is a Jew. The existing regulations do not allow a doctor to settle down and practise as a recognised specialist, unless he has served at least four years in his intended branch of medicine, as "secundarius"—i.e., junior medical officer of a clinic. This is at present out of the question for Jewish doctors. Their chances of having the recognised training are simply cut off, for either they are quietly ousted from the clinics, or they are not accepted. For more than a year no Jewish doctor has obtained an appointment in the Vienna general hospitals, whilst others without any training at all—but "nationals"—have been appointed in charge of wards or as assistants. This was made manifest recently, when the famous chief of a children's hospital abruptly resigned his office. His (Jewish) assistants had been dismissed, and two others were appointed who had only passed their examinations quite recently and had no specialist knowledge at all. The professor declared himself unable to run the big children's clinic without adequate help. His protest had no effect; the responsible authorities were glad to get rid of him by these means, for he, too, was a Jew—on the verge of resignation, it is true, but still a famous man and fit for hard work. Such examples can be multiplied.

The fact is that about half the medical profession in Vienna are threatened with starvation. There will be no young specialists amongst the Jewish population. In the provinces all the Jewish doctors (they number about 200 all told) are in the same plight, and no one knows what is to be done if the present mentality of the ruling circles remains unchanged. At the same time all protests coming from the Jewish community are met with the official assertion that no antisemitism exists; it is simply that the authorities are at liberty to choose, for all sorts of work, such candidates as they think qualified best for it.

QUEEN'S INSTITUTE OF DISTRICT NURSING.—At a recent meeting of the council it was reported that 64,144 midwifery cases were attended by 1000 Queen's nurses and 2855 village nurse-midwives in England and Wales. The maternal death-rate was 2·26 per 1000, as compared with 2·1 per 1000 in 1932; the rate in outer areas was 2·3 per 1000—0·1 more than in rural districts. Statistics of the attendances of Queen's nurses on notifiable and other diseases in connexion with public health authorities showed 15,352 cases of pneumonia, 3553 of complication in relation to childbirth, and 553 of measles with pneumonia.

CORRESPONDENCE

VIRUSES IN RELATION TO THE ÆTIOLOGY OF TUMOURS

To the Editor of THE LANCET

SIR,—In writing of Dr. C. H. Andrewes's valuable contribution to this subject in the Oliver-Sharpey lectures concluded in your last issue, nothing but admiration can be expressed for his balanced and critical exposition, and particularly for the manner in which he has marshalled the salient *objections* to the virus hypothesis. On the other hand, certain observations invite obvious comment, and it is difficult for instance to grant any justification for the statement that "the size of the tumour agent is evidence in favour of its living nature."

It is natural that much significance should attach itself to the successful propagation of the Fujinami fowl myxosarcoma in adult ducks and to the transmission of the Rous sarcoma and other fowl tumours to the pheasant. While the duck may be regarded as "a species widely removed from fowls" and the pheasant as a "foreign host," it should be pointed out that transmission in these cases is nevertheless within the limits of blood relationship as judged by the quantitative precipitin reaction. In the accompanying Table data are quoted from Graham-Smith's classical researches on this subject (in Nuttall's "Blood Immunity and Blood Relationship," 1904) and it can be seen what extraordinary interest these figures possess and what light they throw on the present topic.

Quantitative Measurements with Antisera to Birds' Egg-albumin. (After Graham-Smith).

Egg-albumin tested.	Amount of precipitum.	Percentage.	
Fowl (old)	0·0159	100	Tests with anti-fowl-egg serum.
,, (fresh) ..	0·0140	88	
Silver pheasant ..	0·0075	47	
Pheasant	0·0075	47	
Duck	0·0037	23	
Duck	0·0384	100	Tests with anti-duck-egg serum.
Pheasant	0·0328	85	
Fowl	0·0234	61	
Silver pheasant ..	0·0140	36	

Furthermore, transplantability of fowl tumours to the pheasant is within the limits not only of blood-relationship but also of bastardisation. Poll's *Mischlingsstudien* included a phasianus ÷ gallus cross, and such hybrids have been used in experimental work by Taibell (Riv. biol., 1932, xiv., 55). Again, Trofimov and Tiniyakov have recently drawn attention to the close resemblance between the chromosome-complex of *Phasianus colchicus* and that of the domestic fowl (Biol. Zhur., 1933, ii., 33, English Summary).

All these facts indicate that transplantation between fowl, pheasant and duck should be regarded as within the physiological limits of relative tissue-compatibility. The successful demonstration of the transmission of a fowl tumour to pheasant or duck does not therefore make it less likely that the filtrable agent is a cell-derivative on the one hand or more likely that it is an independent parasitic virus on the other.

Dr. Andrewes has pointed out that "the neutralisation of the Rous virus with anti-fowl serum does indeed suggest most strongly that the virus is more intimately associated with fowl-protein than are other viruses with the proteins of their hosts." This and other features such as the strict specificity of the agents seem to me to indicate that the conception of the agent as an intrinsic cell-product may more than possibly prove correct. The source of the contrast in behaviour between avian and mammalian tumours may then be traced to some inherent cellular difference in the two classes, and already signs are not lacking that some such significant difference may indeed exist. White (Jour. Genetics, 1932, xxvi., 345) studied the somatic chromosomes in 40-hour embryo chicks, and drew attention to the great range in size of the individual elements in the somatic metaphase plates, the smallest ones in the centre being absolutely on the limit of resolving power of the microscope (about 0·2 μ in diameter). This range in size of the chromosomes he regarded as characteristic of birds in general and quite unparalleled elsewhere.

Obviously the data are not yet sufficiently complete to justify any permanent conclusion. We must be grateful for Dr. Andrewes's summary of the present position and await the accumulation of those facts which alone will clarify this fascinating though difficult problem.

I am, Sir, yours faithfully,

ALEXANDER HADDOW.

Department of Bacteriology, University New Buildings,
Edinburgh, July 23rd.

SCARLET FEVER EPIDEMICS

To the Editor of THE LANCET

SIR,—As many of us must, during the past year have had to cope with epidemics of scarlet fever, I have been wondering if there is any satisfactory method of controlling the spread of this disease in ordinary practice.

In 1928, with permission of the honorary staff at the Queen's Hospital for Children, Hackney, I made trial of scarlet fever antitoxin (Burroughs and Wellcome). As an example of this use: one child in a ward having been removed with typical scarlet fever, the remaining seven children were Dick-tested; three were positive and four negative. Scarlet fever antitoxin in graduated doses was given to those showing positive reactions. Three days later they were all negative. No further cases occurred. Following another case later in another ward, the same procedure was adopted, all those showing positive reactions receiving antitoxin; again there was no spread. The method is more applicable to institutions because infectious disease is there instantly discovered and prompt isolation and other precautionary measures are possible. In private practice, if immunisation is to be carried out, it seems inevitable that it must be indiscriminate, without recourse to Dick-testing. I have myself used this method in practice, but with varying results. It seems that we can only offer to contacts, usually parents and relatives, a means of prophylaxis which we must state definitely to be of doubtful value; that we may be justified in urging it for young children, debilitated persons or those with intercurrent disease; and that we can give expectation of probable prevention of the disease, or, if it is acquired, an illness less severe and with less likelihood of unpleasant sequelæ.

It would be very interesting to me, and I venture to think, other members of the profession, to know of experiences or opinions formed from the use of the scarlet fever antitoxin in the practice of general medicine.—I am, Sir, yours faithfully,

Bourne, July 21st.   W. B. R. MONTEITH.

DISPLACEMENT OF THE INTERNAL EPICONDYLE INTO THE ELBOW-JOINT

To the Editor of THE LANCET

SIR,—In your issue of July 14th is published a most interesting article on this subject by Mr. N. W. Roberts. In his first two cases Mr. Roberts proved that it is possible, if the skilled manipulation be done sufficiently early, to dislodge a detached internal epicondyle that has been caught between the humerus and the ulna, and to restore it to something near its normal position, and this without recourse to open operation. The manipulation has twice been carried out successfully by one of us (St. J. D. B.). On the first occasion, a procedure similar to that described in the article under discussion was performed. On the second occasion the inner aspect of the elbow-joint was exposed and then the manipulation was carried out, showing how the epicondyle will come out of the joint provided it is carried out within a few days of the injury. Whether the necessary manœuvre is entirely free from risk we rather doubt.

Mr. Roberts' third and fourth cases are of an entirely different type, and their inclusion seems rather to confuse the issue. The internal epicondyle in these cases was no more *in* the joint than other structures displaced by the partial dislocation. One might as well say that the tendon of the brachialis anticus was *in* the joint in every case of posterior dislocation of the ulna. Reduction of the subluxation and of the displacement of the epicondyle in these cases should not have presented any special difficulties, and the success achieved, in our view, is in no way comparable to that obtained by Mr. Roberts in his other cases. In the first two of these cases the epicondyle was caught and held between the humerus and ulna, and could only be dislodged by a very skilful manœuvre or by operation, whereas in the second two the epicondyle was only displaced by its connexion with the ulna, and was never caught between the bones, though in the last this might have resulted if the reduction had been in other hands.

There seems no doubt but that separation of the epicondyle is usually the result of violent abduction of the forearm, what we like to refer to as "attempted dislocation." As a rule the gaping joint closes again leaving the epicondyle more or less displaced. Very rarely it is sucked into the inner side of the joint and prevents the humerus and ulna from coming together again. The ulnar nerve may or may not be damaged. If outward dislocation occurs the epicondyle follows the ulna and will be pushed inwards on reduction, with little chance of being caught between the bones. Again, when posterior dislocation occurs the internal lateral ligament may be torn or the epicondyle avulsed. In the latter case the epicondyle is naturally forced into the empty sigmoid notch by atmospheric pressure. On reduction the epicondyle may not slip out of the way, and then it is caught between the bones. We have films of two cases showing this sequence of events. In 1924[1] one of us (H. A. T. F.) referred very briefly to four cases of nipping of the epicondyle between the bones. Twenty-one others have since been seen by one or other of us, making a total of 25. Unfortunately none of these were seen before the dislocation, when present, had been reduced. It was difficult, and sometimes impossible, to get any clear details of the exact condition after the accident, but there appears to have been a clear dislocation, which was then reduced, in 16, and definitely no dislocation in 3. The ulnar nerve suffered damage in 12, two being cases without dislocation. Only three cases were dealt with less than seven days after the accident, and in many the interval was very much longer. With one exception every case was treated by open operation.

In the first place may we suggest that it will simplify matters if the above title be applied only to those cases in which the detached fragment is lying actually between the humerus and ulna? Secondly, the decision has to be made whether the patient benefits by manipulative treatment in place of open operation in cases of displacement of the internal epicondyle into the elbow-joint: (*a*) when no ulnar nerve paralysis is present, and (*b*) in the presence of ulnar nerve paralysis.

(*a*) It is fair to assume that manipulative treatment is likely to be successful in displacing the fragment and probably aligning it into a position compatible with a first-class result. Experience is too small to express an opinion as to whether ulnar nerve paralysis will follow such a manipulation in any of the cases. (*b*) In the presence of ulnar nerve paralysis, the manipulation appears to be a procedure not without danger. Should the reduction be successful, the patient may be faced with an operation for transposition of the ulnar nerve. Operative experience shows that open replacement of the fragment, combined with anterior transposition of the nerve in those cases in which the surgeon thinks this wise, is an eminently satisfactory method of treatment, although recovery may be slow. It is urged, therefore, that the general principle of a nerve injury complicating a fracture indicating operation, should be adhered to in cases of ulnar paralysis complicating displacement of the internal epicondyle into the elbow-joint.

We are, Sir, yours faithfully,

H. A. T. FAIRBANK.

Harley-street, W., July 21st. ST. J. D. BUXTON.

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[1] Proc. Roy. Soc. Med., 1924, xviii. (Sect. Orthop.), p. 11.

PERINEO-ABDOMINAL EXCISION OF THE RECTUM

To the Editor of THE LANCET

SIR,—I have read with great interest and pleasure Mr. Gabriel's article in your issue of July 14th, and my appreciation is heightened by the fact that I have enjoyed the privilege of seeing him perform this operation at St. Mark's. I am sure that he will agree with me that surgery is indebted to Prof. Grey Turner, of Newcastle, for having introduced operators to this order of events in "combined operations" for cancer of the rectum. I was first introduced to the operation by watching it in Newcastle in 1919, and the method was published in the *British Medical Journal* (1920, ii., 734) by the originator.

For those who dislike terminological hybridity, the name "perineo-abdominal" may not be the best from an etymological point of view: I plead guilty to having introduced the term myself a few years ago, and although "I have the Greek," as we say in the Far North, I have, alas! been responsible for perpetuating a heterogeneous combination, to which we were first introduced by the great proctologists who perform the operation in the reverse direction. The description "sacro-abdominal" is a better literary combination, but is hardly so accurate a description of the modern operation which Mr. Gabriel has so well described.

I am, Sir, yours faithfully,

Harley-street, W., July 18th. G. GORDON-TAYLOR.

PANEL AND CONTRACT PRACTICE

Medical Cards

THE last report of the organising medical secretary the London Panel Committee tells of various ways which the doctor's time is used up in explaining ocedure to insured persons.

THE MISLAID CARD

If for some reason an insured person cannot find is medical card he has to fill up a postcard form Med. 50), on which he gives particulars of his insurnce status. This is posted to the insurance committee hich, after verifying the particulars given, send him blank new card. He is instructed to take this card o the doctor of his choice who, if willing to accept im as an insured person, fills in Part A of the new ard agreeing. The doctor then posts the card to the ommittee which returns it to the patient. Several ostages are involved in this cumbrous procedure. lthough, in fact, an insured person can obtain form Med. 50 from a local post office, he generally obtains it rom the doctor he is consulting. If, therefore, it ontained the necessary form of words for his acceptance, the whole business of joining a doctor's list could be effected on a single form.

CHANGE OF DOCTOR.

This is not always a simple matter in view of the fact that some insured persons vary widely in educational attainments. Some can hardly read at all, others often cannot read English. The instructions are couched in language that is not easy for the unlearned to follow. Take for instance the following :

> "It is regretted that it is necessary to return the enclosed communication, but as the individual signatures of the applicants to transfer are not endorsed thereon it is not possible at the moment to grant the authority you require. As soon, however, as the attached letter is duly signed by all the persons concerned or, alternatively, separate applications are received, the necessary consent to transfer will be given."

This could surely be expressed more simply. Under present regulations it frequently happens that an insured person misses, it may be by a day or two, his right to transfer at the beginning of a quarter. If, for instance, he sends in a Notice on March 3rd, he will be at least two days late for transfer on April 1st, and will not be allowed to change doctor until July 1st. If during that period treatment becomes necessary he is, of course, still entitled to it from his present doctor ; but as he wants to change he is not likely to consult him, and he pays for treatment elsewhere. Why should he not be allowed a few days grace ?

IRREGULAR TRANSFERS

The doctor is supplied only with the name of the insured person who has transferred, not with his address. This makes it difficult for him either to spot an irregular transfer or to communicate with the insured person about it. A further difficulty arises when a patient living near the border of one county committee moves—it may be only across the street —into another committee's area. Such a patient is sent a new medical card with no doctor's name on it, from which he concludes he has been removed from his old doctor's list (as of course he has been), and that he must, therefore, choose a new doctor; whereas, provided his old doctor is on the insurance list of the new committee—and most medical men living near the borders of committee areas generally join both or more committees in that area—the patient is at liberty and likely to wish to remain under the care of his old doctor. It should not be difficult to convey this by a suitable slip to these border transfers.

The primary difficulty in all these medical card matters is to put in, or on, or with, the card information which will catch the eye and be readily understood by an insured person who reads it. At the present time there is so much printed on the card, the type used is so small, that it is not to be wondered at if the great majority of insured persons have never read the rules, and often not even the slips attached to the card. Ample evidence of this is afforded by the number of insured persons with unsigned medical cards, who think they need only take them to a doctor for signature when they are ill.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Rear-Admiral G. L. Buckeridge to be Deputy Director-General of the Medical Department of the Navy vice Surg. Capt. C. V. Griffiths.

T. F. Davies to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS

R. H. Foster to be Lt. (on prob.). (From R.A.M.C., T.A., Supern. for serv. with O.T.C.)

The undermentioned Lts. (on prob.) are restd. to the estabt. : A. G. D. Whyte, R. A. Stephen, and M. J. Horgan.

ARMY DENTAL CORPS

Lt. A. N. Moon to be Capt.

RESERVE OF OFFICERS

Lt.-Col. C. W. Bowle, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

SUPPLEMENTARY RESERVE OF OFFICERS

Lt. J. N. Heales, from Somerset L.I. Supp. Res. of Off., to be Lt.

MILITIA

Maj. S. W. Hoyland retires on attaining the age limit, and retains the rank of Maj.

TERRITORIAL ARMY

Lt. T. T. P. Murphy to be Capt.

C. F. Critchley (late Offr. Cadet S. S., Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. R. E. Davie, from Active List, to be Capt.

Lt. I. Mackintosh, from Active List, to be Lt.

Lt. E. L. Hancock to be Capt.

ROYAL AIR FORCE

Flight Lt. L. C. Palmer-Jones is promoted to the rank of Squadron Leader.

RESERVE OF AIR FORCE OFFICERS

Flight Lt. E. P. Carroll relinquishes his commn. on completion of service.

INDIAN MEDICAL SERVICE

Lt. R. I. Reid to be Capt.

BOGNOR WAR MEMORIAL HOSPITAL.—The annual report states that, in consequence of pressure upon the beds, extensions will probably be needed in the near future. There were 392 in-patients, whose daily cost was reduced from 9*s*. 10*d*. to 8*s*. 1*d*., the lowest figure since the hospital was opened in 1919. In the private wards no bed was vacant for more than a week. Income increased from £1465 to £3087, accounted for mainly by a larger volume of patients' payments.

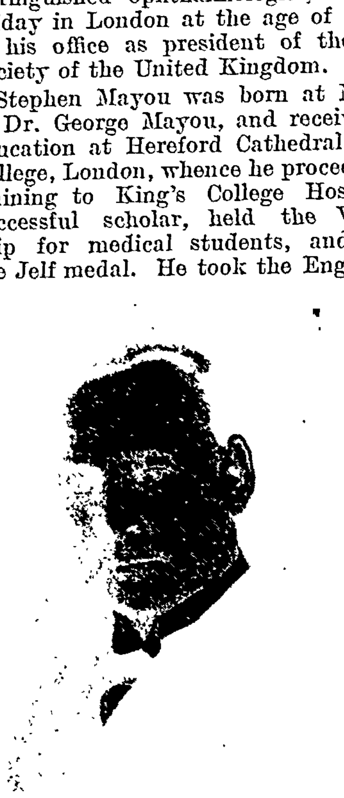
OBITUARY

MARMADUKE STEPHEN MAYOU, F.R.C.S.

PRESIDENT OF THE OPHTHALMOLOGICAL SOCIETY

We deeply regret to announce the death of this distinguished ophthalmologist, which occurred last Friday in London at the age of 58 and in the year of his office as president of the Ophthalmological Society of the United Kingdom.

Stephen Mayou was born at Monmouth, the son of Dr. George Mayou, and received his preliminary education at Hereford Cathedral School and King's College, London, whence he proceeded for professional training to King's College Hospital. He was a successful scholar, held the Warneford Scholarship for medical students, and gained, in 1896, the Jelf medal. He took the English double diploma in 1897, and in 1901 proceeded to the F.R.C.S. Eng. He served as house surgeon at King's College Hospital, and became assistant radiographer to the hospital and demonstrator of anatomy in the medical school. He then decided upon the specialty which he later followed with such fine results and in such a variety of public positions. He was appointed clinical ophthalmologist to his hospital as well as surgical registrar, and held also a clinical post in the ophthalmological department of the London Hospital. He became assistant surgeon to the Royal Eye Hospital at Southwark, and held the same post at the Seamen's Hospital at Greenwich. He was for a time at Moorfields, being chief clinical assistant at the Royal London Ophthalmic Hospital, and was also ophthalmological surgeon for different periods at the Children's Hospital, Paddington Green, and at the Hospital for Paralysis in Maida Vale. But the institution with which his name is principally associated was the Central London Ophthalmic Hospital, where he served over a long period as assistant surgeon, pathologist, and full surgeon, being the senior member of the staff at the time of his death.



MR. MAYOU

[*Photograph by Elliott & Fry*

In 1903 Mayou gained the Jacksonian prize at the College of Surgeons for an essay on the pathology and treatment of conjunctivitis in its protean forms, and in 1905 was a Hunterian professor at the College, while his contributions to the proceedings of the Ophthalmological Society now became regular, and of marked value. He was, indeed, one of the most frequent interveners in the discussions of the Society for the last 30 years, and his opinions were always listened to with interest, especially when those pathological questions were in debate where his experience was so wide and so varied. He was on the council of the Society for many years, served as secretary from 1916 to 1919 and as vice-president in 1932, and last year was elected president. At the last congress of the Society he was prevented illness on the first day from presiding, but his recepti on the second day demonstrated alike the high este ni which he was held and the opinion of the members that he had fully merited the leading position he had gained.

Mayou was not a profuse or frequent writer, but his handbook upon diseases of the eye, which went through three editions, the last appearing in 192 was seen to have features of practical value. This treatise was kept deliberately short, the author intimating that in his opinion the students' curriculum was already overburdened, but, while not pretending to give a complete account of diseases of the eye, it served to convey the essentials with which every medical practitioner should be familiar. He included in the book figures illustrating the microscopic appearance of such conditions as phlyctenular conjunctivitis and arterio-sclerosis of the retina, and proved that he had made himself a thorough master of this field of ophthalmology. A more widely known work is that which he wrote on ocular pathology in conjunction with his friend Treacher Collins, which embodied the results of their joint researches, and was excellently illustrated by figures, many of which were reproduced from original papers in the transactions of the Ophthalmological Society. This work, again, made no pretence to be encyclopædic but proved a most valuable handbook to ophthalmological specialists. On the death of Treacher Collins, Mayou succeeded him as medical officer to the White Oak Hospital, Swanley, an institution under the authority of the Metropolitan Asylums Board for the treatment of children up to ten years of age suffering from ophthalmia and other contagious diseases of the eye; he was also visiting ophthalmic surgeon to St. Margaret's Hospital, run, under the same authority, for the treatment of ophthalmia neonatorum. In both of these institutions he found time to give valuable service, although it was always the Central London Ophthalmic Hospital which absorbed his main attention.

Mr. Leslie Paton writes: "Others can write of the distinguished scientific and clinical work that Mayou has done. I should like to be allowed to say just a few words about another side of his work which has proved of the greatest value to British Ophthalmology but which is, as a rule, only too little recognised, work done on councils, committees, and subcommittees. Only those who were associated with him in these too often thankless tasks know how faithfully he did anything he undertook to do. He served on the editorial committee of the *British Journal of Ophthalmology* from its initiation in 1917. That involves, as a rule, two meetings a month. He was one of the earliest members of the Council of British Ophthalmologists and, in addition to being treasurer, served on many of its committees. Only three days before his death he attended a meeting of the executive committee and almost the last letter he wrote on the evening before he died dealt with its work. He was at various times member of the council, secretary, and vice-president of the Ophthalmological Society of the United Kingdom and I am sincerely thankful that he lived to achiev the highest honour in British ophthalmology, the post of president of that society. It is only too difficult to find men willing to give their time and energy to committee work of that type which brings little credit or honour to the individual worker, but n its way as essential as the more showy scientific clinical work, and it is only an ordinary truth to y that on all these committees the place that Mayou upied will be difficult to fill. Whether on the golf urse, the riverside, or in the quietude of social life was a charming companion. A slight occasional t characteristic hesitancy of utterance served only draw attention to the clearness of his thinking d the lucidity of his expression. In all ways he lfilled the dictum of our first president, Sir William owman, and by his life's work advanced the science ophthalmology."

FREDERICK DITTMAR, M.D. Glasg., D.P.H. Camb.

ATE SENIOR MEDICAL INSPECTOR, LOCAL GOVERNMENT BOARD FOR SCOTLAND

THE death occurred on July 16th of this well-known uthority on public health, who retired from his fficial post in the Department of Health for Scotland n February last at the age limit. He died somewhat uddenly at his house in Newbury, Berkshire, where he had just established himself.

Frederick Dittmar was born in Edinburgh, his ather, the author of a well-known text-book, who later became professor of chemistry at Anderson's College, Glasgow, being at the time on the scientific staff of the University of Edinburgh. The son received his education, general and professional, at the University of Glasgow, where he graduated as M.B., C.M. in 1893, proceeding to the doctorate with honours three years later. He now spent a period in Vienna and acquired German as a native language, an accomplishment which stood him in good stead later. He became house surgeon and house physician to the Victoria Infirmary, Glasgow, and acted as assistant medical officer in charge of the Fever Hospital. He left Glasgow for a time to serve as M.O.H. at Scarborough, but returning to Glasgow was appointed by Dr. Burn Russell, then M.O.H. of the city, upon his staff. While serving with Dr. Russell he had particular opportunities for the study of small-pox questions from the public aspect; and he also acted as assistant medical officer to Glasgow Prison. During the first outbreak of plague in Glasgow he also gained unusual clinical experience through his coöperation during the epidemic with the late Dr. John Brownlee, the well-known statistician, who was then superintendent the Belvedere Hospital.

DR. DITTMAR

Dr. Russell became medical member of the L.G.B. r Scotland, and was succeeded on his death in 1904 by Sir Leslie Mackenzie, the first medical inspector under that Board. Dittmar then succeeded Sir Leslie, and when the Board was amalgamated in 1919 with the Scottish Insurance Commission, thus becoming the Scottish Department of Health, Dittmar was appointed to the Department, having full familiarity with every phase of public health. His intention to remain in touch with systematic medicine was manifested by his sitting, at a much later age than usual, for the examination for the M.R.C.P. Edin.; later he became F.R.C.P. Edin., and acted as an examiner for the College on more than one occasion. At the Board he did admirable work, in particular when he took charge of the infectious diseases hospitals of Scotland. He made many special inquiries and was untiring in his energies, and his brief but concentrated report on the Island of Lewis and the conditions of housing there was the start—the somewhat sensational start—of a reform movement which has never stood still. In the later years of his service he acted frequently as medical assessor at housing inquiries under the new Acts. While he wrote no systematic book he published valuable papers upon many public health matters, notably one on slaughter houses and meat inspection; another, in coöperation with Brownlee, on the administrative treatment of scarlet fever, or rather of undefined cases diagnosed as such; and a third on the control of small-pox. In his writings, as in his official actions, he was a sound though friendly critic; his judgment was widely appreciated.

Dittmar was highly popular with his staff, who entertained him at luncheon on his retirement and made him a present of books. His death was unexpected, and occurred when he appeared to have a pleasant phase of retirement before him. The photograph which is reproduced here shows him in young middle life, no more recent portrait being available. He leaves a widow, a distinguished classical scholar, and three daughters, one of whom is a medical student.

JAMES WILLIAM STEEL, M.B. Edin.

THE death of Captain J. W. Steel, of Bournemouth, at St. Bartholomew's Hospital on July 14th, will be felt by many who served with him on the Salonica front during the war. Having graduated in medicine at Edinburgh in 1913, and held a resident post at Bolton Infirmary, he joined the R.A.M.C. and was attached to the 28th General Hospital on the Monastir Road where, writes one of his war-time colleagues, his ability as a physician and his genius for music made him an outstanding figure in the mess, the wards, and at the concerts given to entertain the men. "Jimmy Steel," he adds, "was regarded with universal affection; every man, woman and child who came into contact with him had a good word for him." After the war Steel put up his plate in Bournemouth and became a popular practitioner there.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, last year admitted 6725 in-patients and treated 28,484 out-patients, a considerable reduction in each category. The annual report suggests that these reductions are probably attributable to the higher standard of health prevailing throughout 1933, a view borne out by the similar experience of many other hospitals. There was an adverse balance on the year of £11,698, which would have been much greater but for the receipt of £17,667 in legacies. The rebuilding fund makes slow progress; £11,655 was collected last year. In-patients cost £4 1*s.* 1*d.* each per week; out-patients cost 8*s.* 9*d.* each. The new nurses' home in Guilford-street is now completed and ready for occupation. It is a seven-floored building on the site of 13 houses, and contains accommodation for 156 nurses. Eventually there will be an extension provided by the demolition of three other houses, to include the preliminary training school for nurses.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Housing Policy: The Question of a Housing *Commission*

IN the House of Lords, on July 18th, Lord BALFOUR OF BURLEIGH moved the following motion:

> "That in the opinion of this House the provision of one million houses to be let at a weekly rental, inclusive of rates, of 10s. and under, in addition to the slum clearance proposals of the Government, is an urgent national need, and to request the Government to consider the desirability of setting up forthwith, under the authority of the Minister of Health, a Housing Commission armed with all necessary powers, and charged with the specific duty of securing the erection of such houses by local authorities and public utility societies on a national plan and with the minimum of delay."

He said that the intentions and desires of the Government in regard to housing were excellent, but there was a danger of the failure of the Government's programme through lack of a coherent plan. They knew of the plan for slum clearance and they were told that there was coming a plan for dealing with overcrowding, but they have not yet been told of any plan for additional new houses to let at low rents, and he thought that the Government had tackled this problem from the wrong end. It was, he said, now admitted as a principle, to which the Government was almost prepared to agree, that the provision of a certain standard of housing accommodation for every family at a rent within the family capacity to pay must as an ultimate aim be accepted as a national duty and a public responsibility. Housing was by far the most important of the social services.

There had been eight Ministers of Health since the war, and still they had not found out what the task was with which they were faced and which they had to accomplish. That seemed to be one of the strongest arguments for the *establishment of a Housing Commission*. In the provision of a million houses there were certain factors to be taken into account. First of all there was the excess of families for the number of available houses. That excess of families had increased in the last census period, and was now over a million. He knew that was *subject to qualification.* There was also the degree of overcrowding. The Registrar-General's figures gave, he thought, 2,600,000 people living more than two to a room—admittedly an excessively high standard. More houses were needed for them. Then there was the estimated future increase in *the number of families.* Economists said that it would amount to 600,000 more families in the next ten years. There was also the progressive deterioration and wearing out of the houses.

Lord Balfour said he regarded a million houses at 10*s*. a week as a conservative estimate of the requirements. If that was so, the Government would have to adopt a totally new point of view. It was necessary to make a plan and secure the advantage of long-scale planning. The provision of a million houses would cost £350,000,000 or £400,000,000 spread over the necessary period. He was not afraid of that. Money could easily be raised by the Government at about 3 per cent. There should be a guarantee to provide cheap money inasmuch as that was far cheaper than a subsidy. The Government was open to criticism also on their attitude towards private enterprise. It was common ground that private enterprise now could not provide houses at the required standard to let at 10*s*. a week. What was needed was continuity in housing policy and continuity in plan. If a housing commission had been set up in 1919 some of the mistakes of the past would have been avoided, and if it was set up now new mistakes, which would otherwise be made, would be avoided. What he was suggesting was not a colossal bureaucracy but a central *constructive organising* brain to view the whole thing from a national point of view.

Lord AMULREE said that although very substantial progress *in housing had been made since* 1919, and much money had been expended both by the Exchequer *and the local authorities*, the various schemes had made little or no provision for the lower paid worker who was still left in the slums and overcrowded houses. The real measure of overcrowding was to be ascertained on the basis of living accommodation per person.

Two persons to a room was a low standard; the minimum standard was generally regarded as an average of one and a half persons to a room. The London County Council on its building estates observed a standard of one and a quarter persons per room. If they took an average of one and a half persons to a room they found some very striking results. According to the census of 1931, 2,630,000 persons lived more than two to a room. The additional accommodation required to rehouse them at one and a half persons to a room might be estimated at a further million rooms, or 250,000 houses—probably 300,000 houses if they allowed for the segregation of the sexes. Competent observers considered that the number of families might be expected to increase at an enhanced rate compared with the increase of population. Further, many of the present houses were gradually wearing out, and according to his information there would probably be a wastage of about 30,000 houses per annum for the next 15 or 20 years.

If, said Lord Amulree, they took all these other factors into account it was estimated that 1,900,000 houses must be provided during the next ten years to house families separately and at least 1,000,000 of these must be provided at inclusive rentals of 10*s*. a week and under to supply the needs of the lower paid workers. For this nation-wide undertaking a special Board such as a Housing Commission would make for continuity of policy, almost impossible under the present system with some 1800 local authorities.

The Earl of LISTOWEL said that the report of the Amulree Committee on Housing came at an extraordinarily opportune moment, and he urged the Government to embody in their own Bill certain of its outstanding recommendations. The Labour Party, to which he belonged, believed that over a period of ten years 2,000,000 or 3,000,000 new working-class houses should be built.

The Earl of CRAWFORD said there were scores of thousands of new houses in London to-day infested with vermin. The bed-bug was the real health problem in thousands of houses, and it was rapidly extending. The bed-bug was a most dangerous creature; it produced restlessness and troubled sleep which in course of time led to debility and general ill-health. The owners of these new blocks of infested property were now the sanitary authorities, and the Government should not rush their building *programme* unless they had *tolerable assurance that the* new houses in a year or two would not be infested with this curse. Further, they should not immediately begin to rebuild upon a cleared slum area.

GOVERNMENT STATEMENT

Viscount HALIFAX, president of the Board of Education, replying to the debate, said that he would take steps to see that the concrete proposals made by Lord Crawford in regard to bug infestation were brought along with other points raised in the debate to the notice of the Minister of Health. In regard to the proposal for setting up a Housing Commission he *found it* hard *to believe that the rapid execution* of a housing policy would be facilitated by interposing a new body between the Minister and the local authorities upon whose intimate, rapid, and cordial coöperation all housing policy must ultimately and entirely depend. For the most part all the field and scope of work contemplated for the Commission was exactly what was being done to-day by the Ministry of Health; no one had said that that Department was not doing it properly. The existing *position* was one in which local authorities were charged with the duty of considering and submitting proposals for working-class houses in their areas, as they were charged with the further duty of abolishing and replacing slums, and under legislation to be forthming, he understood they were to be charged with similar duty in regard to the elimination of over-owding. Therefore the principle stated in the mulree Committee's report was the basis of the resent Government policy.

As to whether the object of policy should be, as Lord lfour of Burleigh's motion suggested, the production of million houses to let at inclusive weekly rentals of 10*s.*, did not believe that the solution of the housing problem as facilitated by round statements of doubtful validity. He thought that the calculations on which the figure of ,000,000 houses appeared to be based were very far from eing secure. That figure was subject to various deductions, he upshot of which must be that the number of houses equired to be provided at these rents on the committees' wn calculation would be very much less than the suggested 1,000,000. He hoped Lord Balfour would not press as he primary object of housing policy the provision of a definite number of houses, whether 1,000,000 or any other. The principle of such a policy had been tried by successive Governments during the last 15 years and had been discarded as unsound. The present Government policy was rather that of providing, in accordance with an ordered plan, whatever number of houses might be needed to overcome the evil that rightly moved the country to indignation, and to do that by beginning with a direct attack on the conditions which were the most intolerable. Already local authorities had submitted plans for the demolition of all houses which they had found in their areas to be unfit for habitation, and for the provision of accommodation to replace them at low rents. During the next five years 280,000 houses unfit for human accommodation would be swept away, and 294,000 houses would be built for those who were now forced to live under intolerable conditions.

At the end of five years, said Lord Halifax, there would, as they hoped, except in a few towns where a longer period was necessary, be no more slums. In the coming autumn the Government would propose to Parliament legislation to define standards of accommodation and to provide a sufficiency of houses to enable those standards to be observed. These proposals would involve re-housing and re-planning on a scale which it had never yet been possible to contemplate in this or any other country. The Government proposed as an integral part of the next stage of their housing policy to appoint a strong Advisory Committee to which the Minister of Health would be able to refer at all stages for advice on the problems still to be solved.

Lord Balfour said Lord Halifax's statement had given him and his friends a substantial degree of satisfaction. He asked leave to withdraw his motion, which was given.

Housing in Scotland

On July 18th, in Committee of Supply, Mr. Skelton, Under-Secretary of State for Scotland, said that 1933 was a record year for the number of houses completed with State assistance. The number of houses completed under all the Acts was 20,915. For the first six months of 1934 there was again a record, the number of houses completed with State assistance being 11,850. The Government had not been content with attempting to concentrate the attention of local authorities on slum clearance merely by legislating; they had attempted, not without success, to institute a real drive in administration, and in every other way, towards the development and acceleration of slum clearance programmes. The estimated number of uninhabitable houses in Scotland was 61,200 and the local authorities' programmes, mostly fixed, but some still provisional, proposed during the five-year period to build 56,394 houses, or over 92 per cent. of the total number recognised as uninhabitable. Some small proportion of the 61,000 houses might be capable of being reconditioned. The next stage of their programme was to deal drastically, and he hoped finally, with overcrowding. In Scotland about 15 per cent. of the population lived three to a room. The English figure was only about 1·5 per cent., so that here they had a special Scottish problem.

Motor Noise and Public Health

The Road Traffic Bill was further considered by the House of Lords in Committee on July 19th, when Lord Elton (in the absence of Lord Horder) moved a new clause providing that it should be an offence under the principal Act to sell, or to offer for sale or supply, a motor vehicle or trailer for use on the road in this country with an inefficient silencer. The facts of the present situation were, he said, simple, but rather startling. It was already illegal to use on the roads a motor vehicle with an inefficient silencer, but it was not illegal to supply such a vehicle. Under the Road Traffic Act 1930 it was provided that motor vehicles should be equipped with efficient silencers, but this regulation was openly and deliberately flouted.—The Earl of Plymouth, for the Government, said he did not think the solution was quite as easy as was suggested. The present difficulty of enforcement was largely due to the lack of practical means of quantitative measurement of noise, and the special committee of the Department of Scientific and Industrial Research were being asked to consider that point. So soon as definite and adequate " performance specifications " could be laid down, the Minister under the powers which he already possessed would not hesitate to include them in the regulations.—The Earl of Crawford said it might take a long time to settle the methods of quantitative measurement of noise, and meanwhile it would be an encouragement if the Ministry conducted prosecutions against people who left their cars roaring in the street at two o'clock in the morning.—The Marquess of Salisbury said that when, as Lord Horder had told them, this evil was really antagonistic to the public health the time had arrived when something ought to be done.—Lord Jessel thought it did not need a departmental committee to say what was noise and what was not.—The new clause was agreed to.

In the House of Commons on Friday, July 20th, the Domiciliary Nursing Services Bill was read a second time.

Malnutrition in School-children

On a Vote of £28,110,018 (including a supplementary sum of £1,506,000) to complete the sum necessary to defray the salaries and expenses of the Board of Education,

Mr. West moved to reduce the Vote by £100. He said he understood that there were roughly 2,000,000 children in this country between two and five years of age, and of these children 200,000 came from overcrowded or slum homes. It had been pointed out by Sir George Newman year after year that what was wanted was more nursery schools. Last year there were only 58 in the whole country, whereas the number needed must be at least 250.

Miss Rathbone said that an attempt had been made by the Parliamentary Secretary to the Board of Education and by officials to lull the public conscience to rest on the subject of malnutrition. It was maintained first that there was no widespread malnutrition among school-children; and, secondly, that the arrangements for feeding necessitous school-children were sufficient to cope with such malnutrition as existed. Both these assurances were, on the face of them, incredible. There had been lately several inquiries into minimum subsistence needs and the cost of supplying those needs, and every one of those inquiries had produced a scale of needs and an estimate of the cost of supplying them such as could not possibly be realised by a family with several children permanently on unemployment pay, or even by an agricultural labourer or a lowly paid town labourer. She believed the school medical staff were wrong when they said that only 1 per cent. of children were suffering from under-feeding. The routine medical examination took place three times in a child's school life—at 5, 8, and 12 years of age. How could malnutrition be tested in that way It might be urged that it was the business of a school teacher to note preliminary symptoms of malnutrition and report them to the head teacher, who, if he thought necessary, would send the child for a special medical examination. But were the school teachers competent to do that? They were not medically trained. If it was not possible to examine the children medically more frequently, surely they could be measured and weighed. Not nearly enough use was made of school nurses. Arrangements could be made with the local nursing associations. The tests and standards of school medical inspection should be much more carefully regulated and standardised. But even if all this were done she did not believe that they would arrive at a satisfactory test of malnutrition. The proper way to deal with the problem was to adopt a scientific income test worked out by the Board of Education. If the income scale was worked out for the country as a whole, and every child whose parents came below that scale was given free meals, they would know that there would not be a single underfed child, except where the under-feeding was the parent's fault, and then pressure could be brought to bear through the law.

Mr. RAMSBOTHAM (Parliamentary Secretary to the Board of Education), replying to the debate, said that he could not help feeling that having regard to the difficulties of the position and the complexities of the diagnosis the medical officer was just as well qualified to express an opinion on the question of malnutrition as Miss Rathbone. Any department which desired to get the best evidence and expert opinion must take note of the opinion expressed by the medical officers and the reports of school teachers. He thought that Miss Rathbone would do a great deal more good for the cause to which she was devoted by using her great influence to impress on all concerned the necessity for a better understanding of the diet given in homes. One of the great difficulties of medical officers was that when children came to them showing signs of malnourishment, or under-nourishment, it was not always due so much to poverty in the home as to improper and inadequate diet.

The motion to reduce the Vote was rejected by 178 votes to 39.

Sir G. COLLINS (Secretary of State for Scotland), speaking on a Vote of £4,106,935 for the salaries and expenses in connexion with public education in Scotland, which was discussed by the House of Commons in Committee of Supply on July 18th, said that although the reports of the school medical officers and medical officers of health had conveyed no signs that malnutrition among school-children was increasing, one could not ignore the fact that malnutrition did exist. He was advised, however, that defective nutrition was not merely a question of lack of food, but might be largely due to the use of foodstuffs which did not produce good bodily structure and resistance to disease. If that were so, consideration might have to be given to the question of instructing the people in what he might term "the elements of nutrition." It was better to build up healthy children capable of resisting disease than to spend money on the treatment of diseases which could be prevented by proper diet.

Road Traffic Bill

In the House of Lords on Tuesday, July 24th, the Road Traffic Bill passed through the Report stage.

Duty on Artificial Teeth

In the House of Commons on July 24th, Dr. BURGIN, Parliamentary Secretary to the Board of Trade, moved that they House should approve of an Order made under the Import Duties Act, imposing an additional duty on artificial teeth.

Mr. RHYS DAVIES said he believed that the duty would amount to about 1½*d.* per tooth, and he would like to know whether a request for the duty had come from the dentists or from the manufacturers of teeth in this country.

Dr. BURGIN said that there were some 30 million artificial teeth used every year in this country. Ten millions were manufactured at home and about 20 million were imported. The British industry was in a position to meet the whole of the requirements of modern dentistry in this country and to supply all United Kingdom users with teeth of home m facture. The imported teeth came from the U States of America, Palestine, Germany, France, recently from Japan. The highest duty payable a single tooth was just under 1¼*d.* The lowest payable for an operation which involved the of a single tooth under the National Health Insuran Acts was 5*s.*, and a duty which could not in an circumstances amount to more than 1¼*d.* a too would not increase the cost of a denture to t consumer by a single fraction.

Mr. DAVIES asked whether an agreement had b come to with the dentists to that effect.

Dr. BURGIN said that the committee which h examined this matter were of opinion that th increase in duty would not affect the price paid b the consumer.

The motion was agreed to.

HOUSE OF COMMONS

WEDNESDAY, JULY 18TH

Pedestrian Crossing Places in London

Mr. CURRY asked the Minister of Transport if, in vie of his recent experiences in using the pedestrians' crossi in London, he could now make any statement whi would result in more public advantage being derived fro them.—Mr. HORE-BELISHA replied: The experience so far gained with pedestrian crossing-places which have been marked at a number of road junctions in London is sufficiently satisfactory to justify the extension of the scheme to other localities, and I am making proposals f such extensions to the highway authorities concerned.

Spirits for Medical and Scientific Use

Dr. SALTER asked the Chancellor of the Exchequer the quantity of spirits used respectively for the manufacture of recognised medical preparations, or for scientific purposes, in respect of which a rebate of duty was granted under Section 4 of the Finance Act, 1918, as amended, during the latest available financial year.—Mr. DUFF COOPER, Financial Secretary to the Treasury, replied: The quantity of spirits upon which rebate was paid under Section 4 of the Finance Act, 1918, as amended, during the year ended March 31st, 1934, on the ground that the spirits were used in the manufacture or preparation of recognised medical preparations, or for scientific purposes, was 584,000 proof gallons. Information is not available as to the quantities used under the respective heads.

THURSDAY, JULY 19TH

Unemployment Insurance Statutory Committee

Mr. THORNE asked the Minister of Labour is he could now state the name of the chairman and the names of the other members of the statutory committee under Part I. of the Unemployment Act; and what salary the chairman, the vice-chairman, and the other members of the committee were to receive.

Mr. LAWSON asked a similar question.—Mr. O. STANLEY replied: The members of the Unemployment Insurance Statutory Committee are: Sir W. H. Beveridge, K.C.B. (chairman); Mr. A. L. Ayre, O.B.E., J.P.; Mr. A. D. Besant, B.A., F.I.A.; Captain the right hon. C. C. Craig, P.C. (Irel.), D.L.; Mr. A. Shaw, J.P.; Miss Katharine J. Stephenson, C.B.E., J.P.; and Mrs. M. D. Stocks, B.Sc. (Econ.), J.P.

The chairman will receive a salary of £1000 per annum, and the other members' fees of five guineas for each day spent in attending a meeting, subject to a maximum of £500 in a year. No member will be required to give full time to the work of the committee.

Refuse Disposal in London

Sir FRANCIS FREMANTLE asked the Minister of Hea if he had now received the report from the adviso committee on the disposal of London refuse, and when it would be published.—Sir HILTON YOUNG replied: I understand that the interim report is likely to be received before the end of the present month. I am not in a position to make any statement as to publication.

Institutions for the Deaf and Dumb

r. **Caporn** asked the Minister of Health how many ty or county borough councils had applied for per ion to contribute towards the support and maintenance stitutions for deaf-and-dumb persons; and whether ould state the names of such councils and, in each , the amount of the proposed subscription and the on taken by him in connexion with such application.— **Hilton Young** replied: Thirty county or county ough councils have applied during the past year for consent to the payment of subscriptions to missions the deaf and dumb, and I understand that at least e other councils are paying annual subscriptions to h missions. I will send my hon. friend a statement ing the names of the councils and the amounts of the scriptions, and showing what action has been taken each application. In those cases in which sanction s not yet been given to the proposed subscriptions, am making further inquiries as I am not at present isfied that the councils in question have given adequate nsideration to the needs of the missions in respect of the cement of deaf-and-dumb persons in employment.

Mr. **Caporn** asked the Minister of Health whether he s satisfied that local authorities were making as wide a e of the powers provided under Section 67 (6) of the or Law Act, 1930, as was desirable in the public interest; hether he had received adequate response to his circular o. 1337, dated May 22nd, 1933; and whether he would onsider the desirability of extending the provisions of ections 2, 3, and 4 of the Blind Persons Act, 1920, to eaf-and-dumb persons.—Sir **Hilton Young** replied: he answer to the first two parts of the question is in the egative. I am, however, taking action with a view to ecuring closer attention by the local authorities to the uggestions made in the circular mentioned by my hon. riend, and as at present advised I do not consider that resh legislation on the lines he suggests is desirable.

Imported Liquid Eggs

Lieut.-Colonel **Acland-Troyte** asked the Minister of Health whether he had any information to show that the United States of America, or any other countries, prohibited the importation of liquid eggs on grounds of health; and whether he would consider prohibiting their importation to this country on these grounds.—Sir **Hilton Young** replied: The answer to the first part of the question is in the negative. Liquid eggs imported into this country and intended for food must be free from preservatives and fit for human consumption, and, subject to those conditions, I am not aware of any reason for prohibiting their importation on grounds of public health.

Temperature in the House of Commons

Mr. **Bernays** asked the First Commissioner of Works whether he would examine the possibility of fitting electric fans in the chamber in order to produce a cooler atmosphere during the summer months.—Mr. **Ormsby-Gore** replied: The air is already drawn through this chamber by means of electric fans which could be speeded up if necessary, but I fear that the draughts created thereby would inconvenience hon. Members. The installation of electric fans in the chamber itself would only create draughts without reducing the temperature, which during the recent warm weather has never exceeded 71° F. To reduce the temperature further without increasing the humidity of the air to an uncomfortable point would involve provision of plant at a cost of some £4000 or £5000, in addition to running costs of some £500 per annum; and I should be disposed to doubt whether conditions as they exist are such as to warrant expenditure of that order.

Ribbon Development and Road Accidents

Mr. **Cadogan** asked the Minister of Transport whether, in view of the continued increase of road accidents, it was s intention to introduce legislation dealing with ribbon velopment on the main roads at an early date.— . **Hore-Belisha** replied: I am devoting attention to this question in conjunction with my right hon. friend the Minister of Health, and my hon. friend will not expect me to make any statement as to legislation.

Imports of Dental and Medical Appliances

Mr. **Lennox-Boyd** asked the President of the Board of Trade if his attention had been drawn to the fact that the imports of dental, surgical, medical, and veterinary instruments and appliances (except optical) had increased from £163,813 in the first half of 1932 to £215,250 in the first half of 1933, and to £247,022 in the first half of 1934; and what further steps he proposed to take to protect the British industry manufacturing these scientific goods.—Dr. **Burgin**, Parliamentary Secretary to the Board of Trade, replied: I am aware of the facts to which my hon. friend draws attention. Any question of an increase in the duty on these goods must be dealt with by the ordinary procedure under the Import Duties Act.

MONDAY, JULY 23RD

Tarred Roads and Cancer of the Lung

Mr. **Clarry** asked the Minister of Health whether his department had any evidence that cancer of the lung might be caused by dust from tarred roads; and if there were any known fatal cases of lung cancer attributable to this cause.—Mr. **Shakespeare** (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend is advised that a relation between the inhalation of dust from tarred roads and cancer of the lung has not been established, and it is, therefore, not possible to say whether any deaths from this disease can be attributed to this cause.

Sir A. M. **Samuel** asked if the Minister had any record or information showing why there were these great increases in the number of recorded cases of cancer of the lung.

Mr. **Shakespeare**: I would not put it as high as that. The percentage of cancer of the lung is very small.

Sir **Francis Fremantle** asked if the Minister was aware that the number of deaths from cancer of the respiratory organs was only 90 per million, compared with 1500 altogether from cancer generally.

TUESDAY, JULY 24TH

Food Poisoning in Lincolnshire

Mr. **Thorne** asked the Minister of Health whether he could give any information to the House in connexion with the 100 people living in Lincolnshire villages who were suffering from an illness caused by some kind of food poisoning; and whether he had received any information from the hospital authorities about the matter.—Mr. **Shakespeare**, Parliamentary Secretary to the Ministry of Health, replied: My right hon. friend has received reports from the district and county medical officers of health, who state that about 30 persons in the Welton Rural District were affected but that all have now recovered. The cause of the outbreak has not been established, but some pickled meat is suspected.

Grants for Rural Water-supplies

Mr. **Wells** asked the Minister of Health the total amount granted in respect of rural water-supplies to date.—Mr. **Shakespeare** replied: Grants to the total of £132,500 have been provisionally allocated in respect of schemes for 361 parishes estimated to cost £1,037,000.

Medical Practitioners and Economy Measures

Mr. D. G. **Somerville** asked the Minister of Health what arrangements had been made up to date to restore in part to doctors and chemists the losses suffered by them as a result of the economy measures in 1931.—Mr. **Shakespeare** replied: I am sending my hon. friend a copy of a circular which was issued by my department to insurance committees on June 20th, setting out the arrangements for giving effect to the decision of the government to restore, as from July 1st, one-half of the deduction made from the remuneration of insurance practitioners and chemists, as a measure of economy, from Oct. 1st, 1931.

Official Pensions and Salary Cuts

Sir **Herbert Samuel** asked the Chancellor of the Exchequer which were the classes of persons in the service of the Crown or local authorities the amount of whose pensions would be diminished through the fact that their pensions were assessed on rates of salaries which would have been affected by the temporary cuts in salaries or grants made by Parliament in 1931.—Mr. **Chamberlain** replied: Among the main classes in question are the following: Local Government Officers, in so far as they have been subjected to an economy cut and have not been permitted to contribute on and to be pensioned on their uncut salaries under the London Local Authorities Superannuation (Temporary Provisions) Act, 1932, and the Local Government and Other Officers' Superannuation (Temporary Provisions) Act, 1933. As regards Civil Servants and others whose pay was subject to periodical variation by reference to the cost-of-living figure, their pensions have been calculated as from July 1st, 1931, the basis of a cost-of-living figure of 50 in accord [illegible] with the provisions of a Treasury Minute dated March [illegible] 1922 (House of Commons Paper 55 of 1922). The fig [illegible] of 50 for calculation of pensions was fixed in June, 1 [illegible] not as part of the emergency measures in the aut [illegible] of 1931.

MEDICAL NEWS

British Industries House: Medical Section

The opening of the Medical Section of the British Industries House, announced in our columns last week, proved a popular function. The Section was opened by Lord Derby, who said that the movement made particular appeal to him as head of the Travel Association, while he emphasised his belief that those who came to this country for pleasure would be more readily induced also to do business if a convenient centre were furnished. Here, he said, was such a centre from which hospitals could draw practically all that they required. The meeting was crowded, over two thousand persons being present and, on all hands, it was agreed that the display showed the British manufacturer to be alive in a comprehensive manner to the material needs of hospitals, whether those needs were manifested by the demands of the staff, the amenities of the patients, or the facilities for scientific progress.

University of London

At recent examinations the following candidates were successful:—

POST-GRADUATE DIPLOMA IN BACTERIOLOGY

Mary C. Baker, D. N. Chakravarti, S. C. Ghosal, Gareth P. Gladstone, Vladimir Glass, P. P. Grigg, Betty C. Hobbs, G. W. Rea, and F. C. Storrs.

DIPLOMA IN MEDICAL RADIOLOGY

W. M. Hewetson, Patrick Hogan, S. R. G. Pimm, A. M. Vlok.

Dr. J. H. Gaddum has been appointed to the university chair of pharmacology at University College as from July 1st, 1935. He succeeds Prof. E. B. Verney.

Since the beginning of this year Dr. Gaddum has been professor of pharmacology in the Egyptian University, Cairo. An arts graduate [illegible] d as M.R.C.S. from University College [illegible] ıg the staff of the National Institute [illegible] 1927, he worked at first on thyroxin [illegible] in collaboration with Prof. [illegible] ıssociated with Dr. H. H. Dale in his [illegible] ration of acetylocholine at nerve-endings, [illegible] ed the physiological behaviour of vaso- [illegible] ı U. von Euler (Stockholm), H. C. Chang [illegible] (Münich), and others. The general result of this work was to suggest that acetylcholine—or some related choline ester—is the chemical transmitter of the effects of nerve impulses, nc [illegible] tion of neoarsphenamine.

Dr. J. R. Marrack has been appointed to a new chair of chemical pathology tenable at the London Hospital Medical College.

Dr. Marrack was born in 1886 and educated at Blundell's School. He graduated in me [illegible] ın 1912 and held the John Lucas Walke [illegible] . C. Brown research scholarship, and a [illegible] was elected a fellow of St. John's Colleg [illegible] lecturer in chemical pathology, making investigations of metabolic disorders in relation to arthritis. Joining the Royal Army Medical Corps in 1914, he served with distinction throughout the war, being mentioned in despatches and receiving the D.S.O. and M.C. In 1919 he became chemical pathologist to the London Hospital and lecturer in chemical pathology in the medical college. With Dr. P. N. Panton he is the author of a text-book, "Clinical Pathology." His later work finds its justification in a valuable report to the Medical Research Council on "The Chemistry of Antigens and Antibodies." This was reviewed in a leading article in THE LANCET of Feb. 24th last.

University of Wales

At recent examinations the following candidates were successful:—

M.D.

A. R. Culley and W. Phillips.

M.B., B.CH.

Alice D. Alban, T. A. Blyton, Enid G. Fisher, M. E. Gordon, R. W. Griffiths, Ira B. Lawrence, and S. R. Saunders.

Society of Apothecaries of London

At recent examinations the following candidates wer [illegible] successful:—

Surgery.—F. G. S. Alderson, Univ. of Leeds; G. W. Bende [illegible] St. Mary's Hosp.; J. T. Boocock, Univ. of Leeds; J. A [illegible] McClintock, King's Coll. Hosp.; A. J. McGuire, Charing Cr [illegible] Hosp.; H. J. Ripka, London Hosp.; and F. W. Treadwe [illegible] Univ. of Birmingham.

Medicine.—F. G. S. Alderson, Univ. of Leeds; J. A. Amc [illegible] St. Mary's Hosp.; and S. M. Sabet, Welsh National Scho [illegible] of Medicine, Cardiff.

Forensic Medicine.—T. D. R. Aubrey, Univ. of Oxford a [illegible] Bristol Royal Infirmary; J. W. D. Bull, Univ. of Cambridge and St. George's Hosp.; W. C. Campbell, Univ. of Birmingham; D. S. G. Genge, Univ. of Cambridge and St. Thomas's Hosp.; S. Klein and J. E. T. Munn, St. Mary's Hosp.; S. M. Sabet, Welsh National School of Medicine, Cardiff.

Midwifery.—T. D. R. Aubrey, Univ. of Oxford and Brist [illegible] Royal Infirmary; J. W. D. Bull, Univ. of Cambridge and St. George's Hosp.; G. W. Bender, St. Mary's Hosp.; C. C. Joannides, Univ. of Graz and Westminster Hosp.; S. J. Navin, St. Mary's Hosp.; J. C. Paterson, Univ. [illegible] St. George's Hosp.; and J. F. L. Walley, Ur [illegible] and St. Mary's Hosp.

The following candidates, having completed [illegible] tion, are granted the diploma of the society [illegible] practise medicine, surgery, and midwifery: S. Klein, A. J. McGuire, and H. J. Ripka.

University of Glasgow

The King has approved the appointment of Dr. Samuel James Cameron to be regius professor of midwifery in succession to Prof. J. M. Munro Kerr who retires on Sept. 30th.

Dr. Cameron is obstetric surgeon and gynæcologist to the Glasgow Maternity and Women's Hospital, and consultant to several other hospitals in the city and locality. He graduated as M.B. at Glasgow University in 1901 and after holding posts in the anatomical school and in hospital, became assistant to the regius professor of midwifery. Joining the staff of the Western Infirmary, he wrote [illegible] subjects. Appointment to the Glasgov [illegible] followed, and Dr. Cameron was elected [illegible] became university lecturer in clinical [illegible] producing his "Manual of Gynæcology, [illegible] Manual of Obstetrics." Accounts of hi [illegible] evention of toxæmia in pregnancy have lately appeared in our own columns (1932, ii., 731) and elsewhere. Dr. Cameron is a fellow of the British College of Obstetricians and Gynæcologists and an examiner for the Scottish Central Midwives Board.

University of Edinburgh

On July 18th the following degrees and diplomas were conferred:—

M.D.—W. J. Candlish, J. R. Davidson, F. A. Duffield, Phyllis M. Edwards, *Annie E. Ferguson, W. H. Gillespie, *R. G. Hood, *H. L. Khosla, J. L. Law, *W. V. Macfarlane, S. L. A. Manuwa, *James Milne, W. E. Orchard, Robert Porteous, D. M. Scrimgeour, and **C. E. Van Rooyen.

C.M.—*H. J. P. Brüwer.

* Commended for thesis.

** Highly commended for thesis.

Ph.D.—B. B. Dikshit, M.B.; R. K. Goyal, M.B.; and Basudeva Narayana, M.B.

M.B., Ch.B.—F. S. Airey, A. K. Arif, *R. W. Armour, S. O. Awoliyi, D. A. Baird, P. B. Barker, William Barnetson, P. G. [illegible] W. R. [illegible] Brown, [illegible] Burgin, [illegible] mpbell, [illegible] R. W. [illegible] ckburn, [illegible] J. Cooper, A. F. Cowan, W. J. A. [illegible] Davies, H. W. Dryerre, J. R. Durham, [illegible] S. L. Forrest, H. F. Galler, Ann [illegible] Gibb, David Gilmour, J. C. Goligher, H. M. Grant, J. S. Gra [illegible] N. A. Gray, Norman Gray, R. D. Gray, Arnold Greenbl [illegible] Gunvald C. Gundersen, M. I. Hall, Alison M. B. Hamilt [illegible] John Hart-Mercer, W. K. Henderson, H. B. T. Holland, Isab [illegible] Hood, James Hutton, Augusta S. Inglis, *A. J. Innes, J. R. B. Johnstone, Josephine J. M. Kamm, J. S. Kaufman, J. M. Kerr, T. A. Kester, J. H. Kretzmar, G. K. Lloyd, N. M. L. Lund, John Macaskill, I. R. I. MacDonald, W. T. Macdonald, J. A. B. M'Dougle, G. B. MacGibbon, J. H. M'Intyre, W. R. H. Mackay, I. K. MacKenzie, C. R. M'Laughlin, Neil Maclean, I. P. J. MacNaughtan, John Magill, J. A. Malloch, William Maxwell,

. Miller, N. C. F. Milne, E. K. Morris, *K. M. Morris, T. M. lock, G. M. Naicker, E. E. Nathaniel, C. C. Nicholson, ge Nisbet, E. F. Northcroft, G. J. Partington. M. K. Pillai, . Reeve, S. C. C. Remedios, *A. J. Rhodes, S. G. Roberts, es Ronald, Samuel Rosner, A. I. Ross, J. A. Ross, G. D. ley, A. H. Saleh, James Sandilands, Jane A. M. Shepherd, . Smith, Maud I. Smith, Thomas Sommerville, J. M. M. Steven, t P. Stewart, *J. K. Sutherland, Muriel A. W. Swanston, . Taylor, Mary W. Taylor, J. F. Thomson, R. N. Traquair, G. Waddell, Patricia S. Warren, E. S. Watson, A. J. Webster, O. Westwater, H. I. Whitelocke, Molly B. Wilson, R. H. nfield, I. U. Young, John Young, and Katharine M. Young.

* Passed with honours.

.P.M.—M. U. Ahmad, William Aitchison, Adam Armit, W. M. de Silva, Israel Gordon, Ellen M. Hegarty, Aileen E. thers, and Robert Woodrow.

D.T.H. & H.—Harry Bayliss-Stokes, V. E. M. Lee, A. W. se, G. J. Smit, and George Watt.

Diploma in Psychiatry.—Laura M. D. Mill.

Diploma in Radiology.—F. M. Gordon and A. R. Sahy.

The following awards of prizes were made:—

Cameron prize in therapeutics to Sir E. Sharpey-Schafer, .R.S., in recognition of the advances arising out of his discoveries endocrinology; Ettles scholarship and Leslie gold medal to . W. Armour, M.B.; Scottish Association for Medical Educa-on of Women prize, Molly B. Wilson, M.B.; Stark scholarship n clinical medicine, D. L. C. Bingham, M.B.; Mouat scholarship n the practice of physic, J. M. M. Steven, M.B.; Buchanan cholarship in midwifery and gynæcology, K. M. Morris, M.B.; ames Scott scholarship in midwifery and gynæcology, A. J. Rhodes, M.B.; Beaney prize in anatomy and surgery, R. W. Armour, M.B.; Annandale gold medal in clinical surgery, B.; Royal Victoria Hospital tuberculosis L. C. Bingham, M.B.; Murdoch Brown medicine, K. M. Morris, M.B.; Dorothy ize, Molly B. Wilson, M.B.; Pattison rize in clinical surgery, R. H. Winfield, M.B.; M'Cosh bursary, . M. Parker, M.B.; Gunning Victoria Jubilee prize in surgery, . J. Kellar, M.B.; Gunning Victoria Jubilee prize in pathology, . E. van Rooyen, M.D.; Gunning Victoria Jubilee prize in zoology, Hector Maclean, B.Sc.; Milner Fothergill medal in therapeutics, D. M. Dunlop, M.D.; Thomson memorial medal in child life and health, H. T. H. Arnott, M.B.; and Wightman prize in clinical medicine, J. du T. le Roux, B.Sc.

In an address to the new graduates Prof. A. J. Clark, F.R.S., the promotor, said it was demonstrably untrue that the medical profession destroyed its own livelihood when it advanced knowledge about the prevention and cure of disease. While the death-rate was steadily falling the importance and prestige of the medical profession was as steadily rising. To-day the prevention of disease or its cure at an early stage was becoming the chief function of the doctor, and this was making the practice of medicine both more difficult and more interesting. Medical practice of the future would, he thought, be largely concerned with conditions intermediate between the fields now covered by the sciences of physiology and pathology.

Royal College of Physicians of Edinburgh

At a meeting of the college on July 17th, with Dr. Edwin Bramwell, the president, in the chair, Dr. David Rhys Lewis (Swansea) was introduced and took his seat as a fellow. Dr. John Ronald Currie (Glasgow) and Dr. Alistair Graham Cruikshank (Edinburgh) were elected to the fellowship.

International Association for the Prevention of Blindness

Prof. de Lapersonne presided at a meeting of the executive committee of this association held in Paris, when the activities of the association included the appointment of a commission to discuss the classification of the causes of blindness; among the members are Prof. van Duyse (Belgium), Dr. Mazini Bey (Egypt), Prof. de Lapersonne (France), Mr. Bishop Harman (England), Dr. Marx (Netherlands), Prof. Marquez (Spain), and Dr. Park Lewis (U.S.A.). On behalf of the American Ophthalmological Society and other bodies the Dana medal was presented to Prof. de Lapersonne for his distinguished services in ophthalmology and prevention of blindness. Then followed a meeting of the general assembly in conjunction with the International Organisation for the Struggle against Trachoma. Prof. E. de Grosz (Budapest) spoke, and reports were received of trachoma all over the world from British Colonies (MacCallan), Egypt (Mazini Bey and Tewfik), U.S.A. (McMullen and Rice), Southern Italy (Maggiore), Algeria (Lasmet), Indo-China (Hermant), India (Wright), Greece (Trantas), Dutch Netherlands (Wibaut), and Tunis (Cuenod). The date and seat of the assembly for 1935 were left to be decided later.

Hospital Saturday Fund

The Hospital Saturday Fund collection which takes place on Sept. 22nd will, it is announced, receive an anonymous gift of £1000.

Gordon Hospital, Vauxhall Bridge-road

Hitherto this hospital has never been in debt and has never appealed. Rebuilding and enlargement have now become urgent and it is desired to celebrate the jubilee of the institution by raising £100,000 for the purpose. Sir John Dewar has started the fund with a donation of £10,500.

Carnarvonshire and Anglesey Infirmary

The Princess Royal recently opened a new wing of this hospital which has been erected as a memorial of the late Mrs. Parry Jones, of Cleveland, U.S.A., whose husband has given £12,000 towards the cost. On the same occasion the Princess opened a new light therapy department given by Sir Michael Duff-Assheton-Smith.

Enlarging Shenley Mental Hospital

The county council is already preparing for the enlargement of its new mental hospital at Shenley in Hertfordshire, which was recently opened by the King. Tenders are being obtained for the erection of a second section at a cost of £377,000.

Extension of Kettering Hospital

Lord Henley, chairman of the Northamptonshire public health committee, recently formally opened enlargements of this hospital which have cost £13,000. Two medical wards of bungalow form have been added, with a whole operating theatre block and enlarged accommodation for nurses.

Wigan Infirmary

Last year the Royal Albert Edward Infirmary, Wigan, treated 3669 patients to a conclusion and there were 13,719 new out-patients. The average cost per head was £120 12*s.* 9*d.*, an increase of 9*s.* 8¼*d.* Out-patients cost 9*s.* 4*d.* each, an increase of 4¾*d.* per head.

West Kent General Hospital

The report for 1933 shows that, thanks to the increase from 1*d.* to 2*d.* per week in the contributions to the pay day fund, the ordinary income increased by about £1700. New in-patients numbered 1670, whose daily cost was 8*s.* 7¾*d.*, a fall of 4½*d.* Their average stay was 19·8 days.

Preston Maternity Hospital

A maternity hospital is to be added to Preston Royal Infirmary, and operations have already been begun. It will be an entirely separate hospital of between 40 and 50 beds, and is estimated to cost £30,000 with an additional £10,000 for nurses' accommodation. There will be two general wards, each of twelve beds, six single-bed wards, an antenatal ward of six beds, and a separate isolation block, in addition to two maternity theatres and a small operating theatre.

Prince of Wales's General Hospital, Tottenham

The provision of better nurses' homes has become so urgent that an appeal is being made for £20,000 that one wing may be begun immediately. The nurses' quarters are officially stated to be "in very bad condition and quite unsuitable." Eventually accommodation will have to be provided for 200 nurses. When the first £2000 has been collected King Edward's Fund will double it, and Sir Alfred Barratt has promised £500 if four other persons will give a similar amount.

Hull Royal Infirmary

Last year the deficit of ordinary income over ordinary expenditure was nearly £7000. There have, indeed, been annual deficits since 1928; and the accumulated debt now verges upon £24,000, and the report says that "the infirmary cannot much longer continue to fulfil its full service under these conditions." There were 5544 in-patients, an increase of 141, but at 15,647 there was a fall of 1400 in the number of out-patients. Patients stayed an average of 21·32 days; their average total cost was £7 18*s.* 3¼*d.*, and the weekly cost £2 11*s.* 11¾*d.*

Public Support of Hospitals

A boxing tournament organised by Sir Harry Preston at Brighton in aid of the hospitals and kindred institutions—one of a number during the past 20 years or so—resulted in a sum of £2000 being allocated to eleven institutions. Sir Harry suggests that with a view to impressing the public with the value of the work, every man and woman should be compelled by law to pay a visit to a large hospital once a year.

Hove Home for Blind Women

On July 20th Lord Leconfield opened a new home for blind women at Hove. Known as Wavertree House, it has been purchased and equipped by the National Institute for the Blind. Accommodation is provided for 25 people who have been removed thither from their quarters in Queen's-road, Brighton, and at the home at Clifton, Bristol. The Brighton home is the one where Dr. Moore, the inventor of the Moon alphabet, resided, and it is still being carried on as a centre for the printing of Moon literature, the only one of its kind in the world.

Glasgow Hospital for Sick Children

A fund of £50,000 is being raised for the provision of an orthopædic department, and at the end of last year, the date of the report, £35,000 of the amount had been given. The new buildings will include cots for paying patients. In 1933 there were 5878 new in-patients, 668 of whom were infants under 12 months. The average duration of residence at all ages was 15·5 days, and the daily cost of each patient was 7*s.* 1*d.* The cost of each occupied cot for the year was £129 7*s.* 2*d.* At the end of the year there was a credit balance of £795, attained only by using legacies and special donations. In the preceding year the surplus was £4253.

Congress on Alcoholism

The twentieth International Congress on Alcoholism will be held at the Imperial Institute, South Kensington, London, S.W., from July 30th to August 3rd, when the subjects for discussion will include national surveys of the alcohol problem from educational, economic, medical, legislative, and other points of view; alcohol in relation to motoring and sport; alcohol in relation to heredity and environment; the causes and treatment of inebriety; and the international coördination of temperance work and effort. Addresses will be delivered by Sir William Willcox on the toxicological aspects of alcohol and drug addiction, and Sir George Newman on the teaching of hygiene in schools. Receptions will be given by the president, Lord Rowallan, and others. Membership tickets may be had from the Secretariat, Room H, Imperial Institute.

Donations and Bequests

In addition to other contingent bequests, the late Charles H. Baxter, of Winchelsea, left, on the death of all his brothers and sisters, £1000 to the Royal Waterloo Hospital for Children and Women, £500 to the Royal East Sussex Hospital, Hastings, and the same amount of money to the Central London Ophthalmic Hospital.—The late Miss Laura J. Crabb, of Tunbridge Wells, left, among other bequests, £1000 upon trust for the upkeep of the churchyard of the Parish Church of Great Baddow, Essex, or, failing this, to the Chelmsford and Essex Hospital and Dispensary; £5000 to the Church Missionary Society for Africa and the East, for medical work; £20,000 to the Church of England Zenana Missionary Society; £1000 to the Tunbridge Wells General Hospital; £1000 to the Chelmsford and Essex Hospital and Dispensary; £250 to the Eye and Ear Hospital, Tunbridge Wells; and £250 to the Convalescent Home for Children, Hawkenbury, Tunbridge Wells.—The late Mr. Charles Henry Garton, of Banstead, among other bequests, left £5000 to the Royal South Hants Hospital; £2000 to the Bolingbroke Hospital; £2000 to the London Hospital; £2000 to the Westminster Hospital; £2000 to the Epsom and Ewell Cottage Hospital; £1000 to the Moorfields Eye Hospital; and £500 to the Free Eye Hospital, Southampton.—By the will of the late Mr. John Braund, of Exmouth, the Exmouth Cottage Hospital will benefit by £2000. The late Mrs. Jane Elizabeth Oliver, of Bowdon, Cheshire, left among other bequests £1000 to Ancoats Hospital, for general purposes, and a further £1500 for the endowment of a bed, to be known as "High Croft Bed."

A Stretcher for Railway Journeys

A Great Western Railway carriage cleaner at Ta has designed a new type of stretcher suitable for railways. The ordinary standard stretcher is too wi pass through carriage doors so that invalids have to be into and from the compartment, or conveyed in the guard van. The new stretcher, which is slightly narrower, fitted with a removable "shock-absorber" bed, and an attachment for holding an adjustable bedrest handles that slide in flush with the ends. It can be quickly fixed to or removed from any standard stret fitted in ambulances or those used in hospitals, an cross-rail at each end serves as an extra means of carr short distances and in confined spaces or negotia passage corners. The "Parratt" stretcher, as it named after the designer, has been patented on his beh by the G.W.R., and will be available at its princi stations, and also, on demand, at any station for journey.

Rickets at Manchester

The report of the Manchester Babies' Hospital for the year ended on March 31st last shows the usual diminuti in the number of cases of true rickets sent for admissi The percentage fell from 21·42 in 1924 to 4·99 in 193 This is thought, however, not to be an exact picture the diminution of rickets in the city, since rickets is st prevalent during certain periods of the year amo children not attending welfare centres and in charge o indifferent mothers. There is a decrease where the childre are under medical observation. There were 517 admission and the average stay was 51·59 days. A new nurses' home to house 30 nurses is to be built at a cost of £10,000. Moreover, it is felt that the hospital can no longer remain efficient without an operating theatre. The X ray department is too small for modern apparatus, the massage and sunlight departments are insufficient to cope satisfactorily with the increased work, and the great number of biochemical, bacteriological, and pathological tests necessitates a larger laboratory.

Royal Manchester Children's Hospital.

A grant of £20,000 has been made to this hospital by the trustees of the late Mr. Zachary Merton for the building of a new convalescent home. It will be erected beside the hospital, and an appeal will shortly be issued for £100,000 to endow the 40 beds.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 14TH, 1934

Notifications.—The following cases of infectio disease were notified during the week: Small-pox, (last week 1); scarlet fever, 2343; diphtheria, 1152 enteric fever, 27; acute pneumonia (primary or influenzal), 579; puerperal fever, 38; puerperal pyrexia, 100; cerebro-spinal fever, 23; acute poliomyelitis, 9; acute polio-encephalitis, 2; encephaliti lethargica, 9; continued fever, 1 (Cambridge) dysentery, 14; ophthalmia neonatorum, 86. No cas of cholera, plague, or typhus fever was notified durin the week.

The number of cases in the Infectious Hospitals of the Londo County Council on July 23rd-24th was as follows: Small-po 0; scarlet fever, 1667; diphtheria 1529; measles 894 (las week 1061); whooping-cough 296; puerperal fever, 24 mothe (plus 5 babies); encephalitis lethargica, 269; poliomyelitis, 2 "other diseases," 231. At St. Margaret's Hospital there we 16 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including Londo there was no death from small-pox, 1 (1) from enter fever, 16 (4) from measles, 5 (1) from scarlet feve 13 (1) from whooping cough, 39 (8) from diphtheri 39 (13) from diarrhœa and enteritis under two year and 9 (0) from influenza. The figures in parenthes are those for London itself.

Of the deaths from measles 3 were reported from She 2 from Stoke-on-Trent. Whooping-cough was fatal in t cases at Liverpool. Diphtheria caused 3 each at Portsmout Kingston-upon-Hull and Birmingham. Four fatal cases diarrhœa were reported from Birmingham, 3 from Liverpool, from South Shields.

The number of stillbirths notified during the wee was 249 (corresponding to a rate of 39 per 1000 tot births), including 42 in London.

Medical Diary

nformation to be included in this column should reach us proper form on Tuesday, and cannot appear if it reaches later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, July 30th to SATURDAY, August 4th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square. Tues., at 2.30 P.M., lecture-demonstration (illustrated by cases) on Sciatic Pain, by Dr. A. E. Clark-Kennedy.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery available daily.—Courses, demonstrations, &c., arranged by the Fellowship of Medicine are open only to Members and Associates.

Appointments

MILLER, A., F.R.C.S. Edin., has been appointed Hon. Surgeon in charge of the Ear, Nose, and Throat Department, French Hospital.

Certifying Surgeons under the Factory and Workshop Acts: EDGAR, W., M.B., Ch.B. Glasg. (New Cumnock, Ayrshire); VINCENT, E. W., M.B., Ch.B. Leeds (Filey, Yorks.).

Vacancies

For further information refer to the advertisement columns

Accrington, Victoria Hospital.—H.S. £150.

Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.

Barnsley, Beckett Hospital and Dispensary.—H.P. £200.

Bath and Wessex Children's Orthopædic Hospital, Combe Park.—Res. Asst. Surgeon. £350.

Birmingham, Monyhull Colony Certified Institution.—Jun. Asst. M.O. £350.

Bolton Royal Infirmary.—Res. Surg. O. £250. Also Asst. Res. Surg. O. £200.

Bootle General Hospital.—H.P., 2 H.S's., and Cas.O. Each at rate of £150.

Bradford Royal Infirmary.—H.P. and Two H.S.'s. Each at rate of £135.

Brighton, New Sussex Hospital for Women and Children.—H.S. £100.

Cancer Hospital, Fulham-road, S.W.—Clin. Asst. £250.

Cardiff Royal Infirmary.—Hon. Physician.

Central London Ophthalmic Hospital, Judd-street, W.C.—Chemical Pathologist. £105.

Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Assts. in Out-patient Dept.

Charing Cross Hospital, W.C.—H.P. to Radiological Dept. At rate of £50.

City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.

Colchester, Essex County Hospital.—H.P. £150.

Connaught Hospital, Walthamstow, E.—Res. M.O. At rate of £150.

East Lancashire Tuberculosis Colony, Great Barrow.—H.P. At rate of £100.

Edinburgh Royal Infirmary.—Radiologist. £1500.

Exeter, Royal Devon and Exeter Hospital.—Hon. Asst. Surgeon. Also H.S. to Ear, Nose, and Throat Dept. At rate of £150.

Evelina Hospital for Sick Children, Southwark, S.E.—H.S. At rate of £120.

Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. Ear, Nose, and Throat Surgeon.

Great Yarmouth General Hospital.—H.S. £140.

Grimsby County Borough.—M.O.H. £1000.

Guildford, Royal Surrey County Hospital.—H.S. £150.

Leeds Maternity Hospital, Hyde-terrace.—Second H.S. At rate of £50.

Liverpool, David Lewis Northern Hospital.—Cas. O. At rate of £120. Four H.S.'s, Two H.P.'s. Each at rate of £80. Also H.S. to Gynæcological and Ear, Nose, and Throat. At rate of £80.

Liverpool Heart Hospital, Oxford-street.—Research Fellowships.

iverpool, Royal Southern Hospital.—Two H.P.'s, Three H.S.'s. M.O. to Special Depts., and Res. Anæsthetist. Each at rate of £60. Also Res. Cas. O. At rate of £100.

anelly and District Hospital.—H.S. £150.

London Jewish Hospital, Stepney Green, E.—Cas. O. At rate of £150.

London University.—University Chair of Medicine. £2000. University Chair of Pathology. £1200. University Readerships. Each £800.

Manchester, Ancoats Hospital.—H.P., and H.S. Each at rate of £100. Surg. Reg. and Orthopædic Reg. Each £50. Also Hon. Gynæcologist.

Manchester, Booth Hall Hospital.—Asst. M.O.'s. Each £200.

Manchester Centre, National Radium Commission Scheme.—Asst. Radium Reg. £400–£500.

Manchester, Monsall Hospital for Infectious Diseases.—Jun. Res. Asst. M.O. At rate of £250.

Manchester, Royal Eye Hospital.—Jun. H.S. £120.

Middleton-in-Wharfedale Sanatorium, near Ilkley.—Res. M.O. £250.

Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Jun. Res. M.O. At rate of £100.

Near Pontefract, Ackworth School.—Part-time M.O.

Newcastle General Hospital.—Two H.S.'s and H.P. Each at rate of £150.

Norwich, Jenny Lind Hospital for Children.—Jun. Res. M.O. £100.

Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £120.

Oswestry, Robert Jones and Agnes Hunt Orthopædic Hospital.—Two H.S.'s. Each at rate of £200.

Queen Mary's Hospital for the East End, E.—Asst. Pathologist. £400. Anæsthetist. Locum Tenens. 4 gns. a week.

Queen's Hospital for Children, Hackney-road, E.—H.S. and Cas. O. Each at rate of £100.

Royal Eye Hospital, St. George's-circus, Southwark, S.E.—Hon. Asst. Surgeon.

Royal London Ophthalmic Hospital, City-road, E.C.—Refraction Asst. £100.

Royal Naval Medical Service.—Ten M.O.'s.

Salisbury General Infirmary.—H.P. At rate of £125.

Sheffield Children's Hospital.—H.S. and H.P. Each at rate of £100. Also Res. M.O. £175.

Sheffield, Jessop Hospital for Women.—Asst. Reg. and Obstet. Tutor. £400. Also H.S. At rate of £100.

Sheffield Royal Hospital.—Res. Surg. O. £200.

Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.

South-Eastern Hospital for Children.—Jun. Res. M.O. At rate of £100.

St. Mary's Hospital for Women and Children, Plaistow, E.—Hon. Ophth. Surgeon.

Sutton and Cheam Hospital.—Hon. Radiologist.

Swansea General and Eye Hospital.—H.P. At rate of £150.

Tunbridge Wells, New Kent and Sussex Hospital.—Sen. and Jun. H.S. £175 and £125 respectively.

Torquay, Torbay Hospital.—H.P. and H.S. Each £175.

Warrington County Mental Hospital, Winwick.—Deputy Med. Supt. £750.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

Wolverhampton Royal Hospital.—H.S. for Orthopædic and Fracture Dept. At rate of £100.

Worcestershire Mental Hospital, Barnsley Hall, Bromsgrove.—Second Asst. M.O. £350.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at East Grinstead, Sussex.

Births, Marriages, and Deaths

BIRTHS

HARWARD.—On July 20th, at Odiham, the wife of Dr. R. L. Harward, of a daughter.

JONES.—On July 21st, at Welbeck-street, W., the wife of Arthur Rocyn Jones, F.R.C.S., of a daughter.

MILLER.—On July 21st, at Welbeck-street, W., the wife of Dr. Emanuel Miller, of a son.

ROBINSON.—On July 19th, the wife of Geoffrey Lawrence Robinson, M.B., of a daughter.

MARRIAGES

LYLE—HUGHES.—On July 21st, at Westerham Parish Church, Kent, Eric H. Willoughby Lyle, M.A., M.B., B.Ch., D.O.M.S., to Elizabeth E. Hughes, younger daughter of the late F. R. Hughes and of Mrs. Hughes, formerly of Hale, Cheshire.

DEATHS

CROSS.—On July 14th, at his residence, Clay Point, Flushing, Falmouth, Cornwall, William Foster Cross, M.R.C.S. Eng., L.R.C.P. Lond., consulting anæsthetist to St. Bartholomew's Hospital, London, aged 61.

MACKENZIE.—On July 19th, at Sedgford House, Underdale-road, Shrewsbury, Allan Grant Mackenzie, M.D., M.R.C.P., F.R.C.S., aged 79.

MAYOU.—On July 20th, at Portland-court, Marmaduke Stephen Mayou, F.R.C.S., of Harley-street, and Alison House, Camberley, aged 58.

ROUSE.—On July 17th, at Thalassa, Farncombe-road, Worthing, Algernon Edward Rouse, M.R.C.S., L.R.C.P., in his 62nd year.

WARING.—On July 21st, at Birmingham, after a short illness, Charles John Waring, M.R.C.S., L.R.C.P.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

A STUDY OF THE UNSTABLE BOY

BEING AN INVESTIGATION OF 120 CONSECUTIVE CASES AND AFTER-HISTORIES

BY MURIEL BARTON HALL, M.D.
HONORARY PHYSICIAN TO THE LIVERPOOL PSYCHIATRIC CLINIC

DURING a review of 1300 consecutive cases of early mental, nervous, and behaviour disorders seen at the Liverpool Psychiatric Clinic during the past ten years it was found that 407 were patients in the second decade, 120 of these being male and the remainder female. The discovery that 31 per cent. of the cases were adolescent when first seen at the clinic suggested that an analysis of the case sheets and a comparison with the subsequent histories of these cases might reveal information of interest from the points of view of ætiology, diagnosis, and prognosis.

The following details are those of 120 unselected male adolescents who were between the ages of 10 and 19 years inclusive when first seen at the clinic, and with whom, with the exception of three cases, it has been possible to get into touch either directly or through a psychiatric social worker, within the past three months.

Findings

Of the 120 cases, 62 were referred to the clinic by doctors, 33 by social agencies, 21 by public authorities, and 4 from other sources. Seventy-five were referred because of nervous symptoms, 45 because of a behaviour disorder. After investigation the cases were divisible into five main groups according to their most prominent feature, as follows :—

Psychoneurosis	51
Behaviour disorder	25
Intellectual deficiency	24
Physical disorder	14
Psychosis	6

For the purpose of this paper, the term behaviour disorder signifies a condition of abnormal behaviour from the causation of which mental, nervous, physical, or intellectual factors could be excluded.

The factor of general intelligence was investigated in detail. Classification of the cases according to five grades of intellectual development resulted in Table I. :—

TABLE I.—*Classification according to Intelligence Quotient*

Intelligence.	I.Q.	Cases.
Very superior	Over 130	0
Superior	110–129	12
Average	90–109	47
Inferior	70–89	36
Very inferior	Under 70	25

In Table II. these findings are reviewed in relation to the diagnosis.

TABLE II.—*Intelligence and Type of Disorder*

—	Psycho-neurosis.	Behaviour disorder.	Intellectual deficiency.	Physical disorder.	Psychosis.
Superior ..	9	1	—	1	1
Average ..	31	5	—	8	3
Inferior ..	11	19	—	5	1
Very inferior ..	0	0	24	0	1
Totals ..	51	25	24	14	6

The factors of heredity and environment were onsidered, and their significance in relation to the ases under investigation is seen in Table III.

Of the commoner factors in the heredity, psychoneurosis occurred 26 times, immorality 12 times, alcoholism, insanity, mental deficiency, and epilepsy each 10 times, tuberculosis and violent temper each 8 times. Suicide was twice revealed in the family histories. Two of the patients were known to be illegitimate.

TABLE III.—*Heredity, Environment, and Type of Disorder*

—	Abnormal heredity.		Family group.	
	Absent.	Present.	Normal.	Abnormal.
Psychoneurosis ..	19	32	37	14
Behaviour disorder ..	4	21	9	16
Intellectual deficiency	10	14	16	8
Physical disorder ..	12	2	12	2
Psychosis	1	5	3	3
Totals	46	74	77	43

Environmental factors are always difficult to assess, but in this investigation attention was paid to any factor which appeared to have disturbed the normal relationship of the family group during the patient's childhood. Loss of one parent had occurred in 22 cases—by death 13 times, by desertion 5 times, by separation twice and by divorce twice. In 21 cases there were substitute parents—namely, 7 step-parents, 6 relatives, 1 foster parent, while 7 cases had been brought up in orphanages.

Treatment and After-history

Fifty-four cases were considered as suitable for treatment by psychological methods of approach, but this was actually undertaken in only 36 cases, the remaining 18, owing to distance or hours of employment, being unable to attend the clinic with sufficient regularity. The other 66 cases were considered unsuitable for treatment at the clinic. In each of them, however, recommendations were made to the doctor, the social worker, or the public authority official concerned with the patient's future handling either in his own home or, where necessary, in some other environment.

The relative suitability of cases for treatment is shown in Table IV.

TABLE IV.—*Diagnosis and Suitability for Treatment*

—	Suitable.	Unsuitable.
Psychoneurosis	45	6
Behaviour disorder	4	21
Intellectual deficiency ..	2	22
Physical disorder	0	14
Psychosis	3	3
Totals	54	66

The number of cases in the present series is too small to warrant any statement as regards the result of psychological treatment. The two cases of intellectual deficiency that were considered suitable for treatment were also suffering from a psychoneurosis.

In each case an effort was made to obtain an after-history concerning the patient's progress as regards symptoms and employment since his last attendance at the clinic. In 3 cases this was impossible because the family could not be traced. In 24 the after-history was less than 12 months in duration, a period which is considered not long enough to warrant inclusion in the series. In the remaining 93 cases the after-histories obtained cover periods varying from one to nine years in duration as follows :—

Years	.. 9	.. 8	.. 7	.. 6	.. 5	.. 4	.. 3	.. 2	.. 1
Cases	.. 6	.. 8	.. 7	.. 9	.. 4	.. 12	.. 11	.. 12	.. 21

ADDRESSES AND ORIGINAL ARTICLES

SOME OBSERVATIONS ON INDUSTRIAL DERMATITIS*

By SIBYL G. HORNER, M.B. Lond., D.P.H.
H.M. MEDICAL INSPECTOR OF FACTORIES

DERMATITIS of occupation has a wider interpretation than is usually conceded to the condition called eczema. It includes under the heading of "dermatitis" almost any pathological condition of the skin and its appendages which can be attributed to occupation.

It may be well to deal shortly with the official position of occupational dermatitis. It is not, as is sometimes supposed, notifiable under the Factory and Workshop Act; the only skin conditions which are so dignified are anthrax, "epitheliomatous ulceration," and chrome ulceration. The onus of notification of these is on the practitioner if he believes the condition to have been contracted in a factory or workshop, and also on the occupier of the factory or workshop even though the subject remains at work. The notifiable conditions, as well as "dermatitis due to dust or liquids," are, however, compensatable under the Workmen's Compensation Act. The decision as to whether the condition comes within this description lies with the certifying surgeon, of which there are a number throughout the country. Appeal lies to the medical referee, whose decision as regards the disease is final.

There are two main reasons for the importance of dermatitis of occupation: (1) the fact that one attack of dermatitis in industry is more than likely to be followed by another under the same conditions; (2) the other the enormous cost of the bill of compensation.

In 1932 there were nearly 2000 compensated cases of "dermatitis due to dust or liquids"—the highest figure yet reached. Dermatologists will appreciate the length of disablement which is likely to result among these unfortunate 2000, and will also recognise the lessened security of these workers on their return to their occupation. This is sheer wastage of health and money, for the astonishing fact is that dermatitis of occupation is largely preventable.

We have come to know more about the condition from cases of dermatitis voluntarily reported by employers in industry. About half the compensated cases are subjected to investigation in this way. We know, for example, that more cases of dermatitis are caused by what may be classed as "cleansers" used after work than by irritants directly encountered at work.

One of these cleansers met with recently proved to be largely white spirit with more than a dash of cresylic acid. Notable among these harmful cleansers is paraffin. The *Times* has recently been the medium for some correspondence headed "Paraffin for the bath"! The effects of such treatment, either on the hands of the domestic cleaner or on the more delicate parts of the epidermis of the bather, from any residual paraffin, are evidently not generally appreciated, for no mention was made of them. The ignorance of workers is not, in the circumstances, a matter for wonder.

Some years ago workers were content to leave the signs of toil on their skin until a week-end cleaning, but the modern worker, man and woman, is not so satisfied. Outside the factory manual workers are often indistinguishable from their brethren who handle the pen. It is not necessarily the dirty workers, except those in contact with oil, who acquire dermatitis, but often those with a passion for cleanliness. One man was aggrieved because he was so affected although he washed "twenty-four times daily at the works." It is, of course, praiseworthy and desirable that workers should leave the factory clean, but further education of those responsible is necessary to ensure that the process of cleaning does not produce dermatitis.

The worst offenders amongst cleansers are alkalis (washing soda, soda ash, and chloride of lime, which are popular—the latter two for their bleaching effect), and various degreasing agents, such as paraffin, turpentine, and methylated spirit.

Preventive Measures before Work

But this is, perhaps, beginning at the end. What preventive measures can be taken before work? Gloves are the first for consideration, but unless there is unavoidable contact with powerful irritants such as the strong acids—e.g., sulphuric, nitric, chromic, hydrofluoric; solutions of bichromates of sodium and potassium, and caustic soda, and so forth—gloves are best avoided, although they are valuable against trauma from heat and other physical causes. The best and most widely applicable protection is, in my opinion, afforded by the use of some emollient before work. This can be non-greasy, greasy, or waterproof as the work demands, and not only is a certain degree of protection ensured at work but the final cosmetic wash will not be a further exposure to risk, for it is found that paint, dyes, french polish—to name only a few—will then be capable of removal by gentler methods.

Causative Agents and Occupations

Tables I. and II. show respectively the chief causative agents and the occupations of those affected

TABLE I.—*Causative Agents*

—	1932	1931	1930	1929	1928	1927
Alkalis	148	155	160	157	129	72
Sugar	79	67	71	65	51	32
Oil	81	50	69	104	65	59
Chrome	51	28	57	35	19	6
Turpentine and substitutes ..	64	43	49	67	66	31
Dyes	48	40	47	41	32	34
Chemicals—unclassified	56	44	43	61	20	14
Friction and heat	68	31	43	25	28	17
Petrol, benzol, &c.	24	30	39	30	26	22
Dough	23	38	35	30	40	21
Acids	21	23	28	31	16	34
Paraffin	37	35	26	25	21	26
French polish	19	15	25	17	8	29
Nickel compounds	20	9	19	17	13	7
Accelerators	4	5	11	11	7	19

TABLE II.—*Occupations*

Total	909	666	789	834	662	525
—	1932	1931	1930	1929	1928	1927
Dyers and calico printers ..	104	82	104	54	50	46
Engineers	125	90	102	114	108	81
Labourers	57	56	74	31	31	22
Metal platers and polishers ..	64	44	66	53	47	21
Bakers and confectioners ..	52	56	58	50	58	33
French polishers	45	42	50	40	45	38
Painters	74	29	40	86	46	18
Leather workers and tanners ..	21	19	38	13	8	9
Chemical workers	34	35	31	58	37	52
Rubber workers	25	25	31	19	29	31
Sugar confectioners	38	30	30	37	26	11
Metal workers	31	21	28	27	16	19
Textile workers	34	25	20	14	18	23
Oil refiners	5	10	19	7	1	11
Printers	8	16	19	12	9	5
Sugar refiners	18	12	13	9	15	7
Pottery workers	18	5	13	8	7	6
Flour workers	9	3	9	12	3	5
Biscuit makers	30	20	8	12	4	2

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* An address delivered before the St. John's Dermatological Society on April 25th, 1934.

in the cases of dermatitis in industry which have been voluntarily reported in the years 1927–1932 inclusive.

SUGARS, OIL, AND TERPENES

Of the causative agents *alkalis* have already been discussed; they are very often cleansers. *Sugar* is the chief cause of dermatitis in the manufacture of sugar confectionery, sugar refining, and biscuit making (the processes of "creaming and icing"). There always seems to be an element of infection in sugar dermatitis; one meets with sugar "boils" in sugar refiners, subacute and acute perionychia in sweet-makers. Indeed, among those engaged in candying fruits one is certain to find instances of sepsis around the nails. Sugar may afford a suitable pabulum for organisms either present on the skin or more usually infecting abrasions, possibly themselves caused by trauma and friction of sugary surfaces. There is evidence that the injuries caused by unskilled manicure hasten the development of perionychial infections among sugar workers. The work of MacLeod [1] on the rôle that monilia infection plays in the causation of suppurative perionychia characterised by a pad or bolster-like swelling of the nail wall on workers exposed to sugar, is of striking interest. It may be that the monilias and other yeast-like fungi will provide the key to some unsolved problems of causation in industrial dermatoses.

The *bichromates*, but not the chromates of potassium and sodium, and *chromic acid* cause either a dermatitis or localised ulceration, depending mainly on the presence or not of trauma. Fair-haired people are particularly prone to a "chrome dermatitis," and their presence at a chromium plating or anodic oxidation bath (where aluminium for aircraft is treated against corrosion by sea-water) calls for peculiar care.

It has been found that *mineral oil* is slightly bacteriocidal towards the *Staphylococcus aureus*, the organism frequently associated with oil folliculitis. There is not, therefore, much reason for the fear that oil folliculitis will be disseminated in an engineering shop through the medium of the oil; the medium of infection is more likely to be the common towel. The generally accepted belief is, however, that the infection is autogenous and that the oil both acts as a vehicle and also over-lubricates the skin, causing increased activity of sebaceous glands, the two together resulting in a septic folliculitis. Some success has been achieved in the prevention of this type of dermatitis by the use, after work, of an antiseptic alkaline wash (Dakin's solution B.P.C.) which removes the oil more thoroughly from the skin than can be effected by ordinary methods. It is reasonable to assume that corresponding protection would be afforded if the workers could be prevailed upon to perform a surgical "wash up" before work.

Turpentine dermatitis is now of more than usual interest because the irritating properties of some everyday substances—such as oranges, lemons,[2] and celery [3]—have only recently been recognised as due to the same substance—i.e., limonene—which is itself a terpene. So nearly are lemon oil and turpentine related that the latter was at one time a common adulterant for lemon oil.[1] Orange oil and lemon oil consist of over 90 per cent. dextro limonene. Moreover, pinene, which is believed to be responsible for the irritant qualities of some turpentines, is not only very closely related to limonene but is itself present in lemon oil. There are four grades of turpentine:—

1. Gum spirits of turpentine, made from gum (oleoresin) from the living tree.
2. Steam distilled wood turpentine—i.e., steam distilled from oleoresin within or extracted from the wood.
3. Destructively distilled wood turpentine—the product of distillation of the wood and roots of tree.
4. Wood turpentine; this grade includes the product of (2) and (3).

The lower grades—i.e., (3) and (4)—are believed to be more productive of dermatitis.

Evidence has been produced to prove that steam distilled turpentines contain some ingredient susceptible of removal by fractional distillation, probably a saturated hydrocarbon in small amounts with a boiling-point somewhere between that of *a* pinene and dipentene, which is decidedly more irritating than the other constituents.

Of turpentine substitutes there are a number. The chief are rosin spirit (iodine value 90–180), shale spirit (60 per cent. paraffins and oleofines), petroleum spirit, coal-tar naphtha, and tetralin (tetrahydronaphthalene).

Although dyes figure monotonously in the list of causes, this classification probably includes some cases where cleansers are really at fault, for accurate information as to methods of removal of dyes from the skin is difficult to obtain. Paraphenylene diamine, although the cause of most cases of fur dermatitis [4] outside industry, and of "ursol dermatitis" which followed the wearing of badly dyed leather shoes during the war, does not figure largely in the cause list of industrial dermatitis.

BREAD, WOODS, AND BULBS

All the ingredients of *bread*—flour, improvers, salt, yeast—have been suspect as the cause of dermatitis.

In Australia work has been done on bakers' dermatitis within the last few years, and the conclusions reached were that flour improvers, chiefly ammonium persulphate, were to blame.[5] One man in twenty—fifty in all—were affected in dough making. The rash—vesicular papulo-erythematous in character—was present on the limbs and face. Cutaneous tests revealed sensitivity to ammonium persulphate, and removal of this activator practically abolished the incidence of the disease.

It is worth recording that the amount of ammonium persulphate used in England for the treatment of flour is less than that used in other countries. In England 6 g. and in other countries 10 g. is a usual amount of ammonium persulphate in 100 kg. of flour. A test for the presence of ammonium persulphate in flour may be made by spreading it smoothly with a spatula. A drop of neutral 15 per cent. KI solution will then show a positive result by brown stippling. An examination in this country of workers in the production of ammonium persulphate *did not reveal instances of conditions resembling bakers'* dermatitis. The flour milling industry went into the question very thoroughly and formed a dermatitis committee to report on the incidence of dermatitis within their province. The conclusions were that "workers in flour mills are affected to a less extent than the average population."

There is, it has been found, a definite relation between the occurrence of dermatitis and hand-kneading of dough. Dermatitis among bakers in this country may, it is suggested, be attributed to the physical reaction of contact—often long continued—of the skin with dough, which is hygroscopic. In the heat of the bakehouse sweat and sebaceous glands are active; the baker has in general a soft hyperidrotic skin. Maceration of the horn cells results in loss of the integrity of the natural protectors of the skin. Together with these changes coarse abrasions may readily be caused when the dried and hardened dough is removed, perhaps from a hypertrichotic surface, by the use of a rough sacking towel, or by the assistance of a blunt instrument.

How great a part in the original or subsequent attacks is played by protein sensitisation is worthy of consideration, but it is probable that the prevention of dermatitis among bakers lies in the preservation of the normally protective horny layer of the epidermis with the avoidance of conditions favouring excessive sweating.

It is likely that dermatitis among bakers with the increasing use of mechanical methods resulting in little or no contact with flour and dough will become rarer, but until the condition is no longer met with, each instance is of importance, particularly to the baker himself, because of the often late age of onset and the marked tendency for recurrence.

Workers in certain *woods* share with bakers and some others this very marked tendency for recurrence of dermatitis. It is usual for dermatitis from woodwork to show itself soon after exposure first on the face and neck, with great swelling of tissues. The hands are generally affected later. Sweating is an important factor in causation.

Teak dermatitis is the best known, but other woods less well recognised, producing severe reactions, are Brazilian walnut[6] from which eleven cases occurred among 100 men, patch tests being positive; and Rumanian pine. This wood, used for soundboards of pianos, has been known to produce a severe case of dermatitis in a man aged 56. Rosewood from British Honduras for xylophone keys appeared to have produced typical attacks in two elderly men of experience, who had worked for many years with teak and boxwood without untoward effects. Dermatitis from East Indian satinwood (chloroxylon swietenia) has been the subject of exhaustive research by Cash.[7] The crystalline alkaloid, chloroxyline, the amount of which varied considerably in different specimens of satinwood, was found to produce in two out of three subjects an insidious and severe experimental dermatitis—whilst a resin present in the wood was found to be capable of arousing dermatitis in those who have been rendered abnormally susceptible by chloroxylonine action. Sennear[8] reviewing the question of dermatitis from woods has collected a number of interesting statements as to the nature of the irritants in wood. Non-saturated resinous acids and alkaloids, some of which have been isolated, are considered chiefly responsible by different authorities. In the case of the Tagayasan nut tree a substance allied to chrysarobin was identified.

Dermatitis from that group of chemicals used in the rubber industry to accelerate the process of vulcanisation—"*accelerators*"—is often severe.

Originally lead salts, inorganic salts, and hydroxides were used as accelerators, but in 1906 the value of the group of organic amines was discovered and substituted. To this group belong "hex"—hexamethylene tetramine (urotropin) and B.B. (montana syrup), the butyaldehyde condensation product of dimethyl-p-phenylene diamine—two accelerators which are known among others to have caused dermatitis. Accelerene is paranitrosodimethyl amine and has caused a number of cases. Trimethylamine is a slow accelerator, but it has the advantage of not discolouring rubber where light articles are being made. Dermatitis from its use, however, is reported from Australia.

Practical experience indicates that a chain of circumstances is generally required for the occurrence of more than an occasional case of dermatitis from accelerators. It seems likely that sweating and dry heat plays an important part in the occurrence of such cases, and that friction as well as heat is necessary. The results of experimental work suggest that the use of lotions consisting of the appropriate chemicals might be of value in preventing dermatitis from accelerators.

French polishers and stainers with the trend of fashion are using less bichromate than formerly. Dermatitis that occurs in this group of workers is more often attributable to the use of overstrong soda water to remove the stains from the skin. Experiments show that only ½ lb.–¾ lb. of washing soda to the bucketful of water (roughly two gallons) will remove the stains, but French polishers like to make the solution stronger to save time and then often neglect to rinse off the alkali.

A painter does not as a rule contract dermatitis from paint but from washing with turpentine or its substitutes. The application of cotton seed oil on the hands before using paint makes its removal simple and the same is true of printing ink.

A curious condition of peri- and hyp-onychial dermatitis was found in those constantly handling *flower bulbs.*[9]

It is at first sight curious that the tulip bulb should be the chief offender, for if friction were an important factor the bulbs of hyacinths, narcissi, and daffodils should be prominent. The tulip bulb is peculiar in that it is protected by a single-layered and rather delicate testa which readily splits and exposes the substance of the bulb. Long-nailed workers seemed more susceptible, and the expression of juice from the bulb substance has been found experimentally to produce dermatitis, without previous trauma, around the nails. This effect of handling tulip bulbs, judging from the interest and statements of the general public, seemed a rather common experience.

More recently the sequel to these observations has been studied. I had an opportunity of examining a large number of women cropping and packing spring flowers. The lesions found were of two groups—one, a sparse vesiculo-papular rash on the forearms, and the other, peri- and hyp-onychia. It seemed that the first was caused by handling daffodils and narcissi ("lily rash"), while the other was attributed to tulips. It is interesting to have evidence that the lesions produced by handling tulip bulbs are reproduced by the juices of the stalks of these flowers. Fatal cases of dermatitis, fortunately rare, are not unknown; one of these was a girl who, after apparent recovery from "lily rash," had a recurrence while handling tulips. Finally, while in contact with chrysanthemum plants, the skin condition became acute and septic infection brought about the fatal issue.

Conclusion

The recognition of dermatitis as of occupational origin owes much of its inspiration to a knowledge of the irritants actually encountered. Deductions may sometimes be made from the site of origin—for example, lime, sugar, metol, tulip juice, have a predilection for but are not all confined to the nail area. An irritating dust as opposed to a liquid will usually show itself first on the face and neck, as do certain wood dusts, copra dust, and barley. In the latter, *P. ventricosus* is the cause. Perhaps it will be the association with dermatitis of some other more characteristic lesions (chrome ulcers, salt, and lime holes) which will lead to the identification of the causal irritant. Here it may be remembered that formaldehyde, even in very weak solutions, as well as being a very potent cause of dermatitis, can produce a clean cut ulcer not unlike an early "chrome hole." Oil folliculitis is, of course, easy of recognition, but then it is not strictly a dermatitis. Many cases of dermatitis—especially those not of recent origin and those which have been treated—show no helpful individuality. The worker's description of his job is often quite unintentionally misleading. "Draughting in the limes" does not immediately suggest that there has been contact with tanning solutions; nor is it universally known that "wrapping dollies" is a process in the manufacture of dry batteries, in connexion with which manganese and carbon should be recalled. There are endless conundrums but their elucidation really depends on persuading the patient to describe what he does in his own words, which, if he is a technician, may be far from simple! So many and varied are the causes of industrial dermatitis that a study of this subject emphasises yet again the truth of Bordet's words, "La vie est le maintien d'un équilibre incessament menacé."

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GLANDULAR FEVER AND INFECTIOUS MONONUCLEOSIS*

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(*Concluded from p. 186*)

Morbid Anatomy

FATAL cases of glandular fever are very rare, and usually have septic or other complications; but lymph glands have been removed at biopsy on many occasions. Two principal changes are recorded both of which may be present together. These are lymphoid hyperplasia, which is specially observed in glands removed in the early stages of the glandular type, and hyperplasia of the reticulo-endothelial tissues. The second has been emphasised in recent records, especially those of McLean, Pratt, and du Bois. Both Pratt and McLean's cases were of the febrile type with maculo-papular eruptions.

Pratt had two glands removed during his own attack. The first shows reduction of lymphocytes with hyperplasia of the reticulo-endothelium and numerous swollen cells with large, flat, pale-staining nuclei, which may be accepted as reticulo-endothelial cells. The second gland removed later shows mainly increase of fibrous tissue and scarcity of lymphoid tissue.

It has been suggested that the hyperplasia of the reticulo-endothelial cells is the cause of the appearance of plasma cells or monocytes in the blood. It may be doubted if the changes would differentiate these glands from non-specific lymphadenitis.

On the condition of the bone-marrow there is no satisfactory report.

The Blood Picture

ERYTHROCYTES

There is no change in the red cells and no anæmia in the ordinary course of the illness. The thrombocytes are not affected. During convalescence a slight secondary anæmia may slowly develop and persist for several months.

LEUCOCYTES

The characteristic manifestation is the development of an absolute lymphocytosis, but it will be shown that not only the lymphocytes but all the leucocytes are affected.

The total *number of leucocytes* usually does not exceed, or materially exceed, the higher limits of normal. The counts commonly lie between 6000 and 15,000 per c.mm., but there are numerous instances in which it has greatly exceeded this figure. Hueper, in a single case, records figures of 50,000 to 87,000, but the diagnosis is very doubtful. Stepp and Wendt are credited by Schwarz with a count of 80,000, but this is a misapprehension, for the highest figure in their article is 27,000. All counts of over 40,000 which I can find in the literature are given in Table I., and it will be seen that they are all in infants or young children. Both the lymphocytes and the polynuclears are increased. The highest number in my own experience is 35,000 in a child of six years, and 33,000 in an adult. There is no recorded case of over 40,000 in an adult. It may be accepted that in adults and children over seven years, figures over 20,000 are unusual, over 30,000 are rare, and 40,000 is the maximum. In infants and young children, 60,000 may be reached exceptionally, but it will be noted that 85 is the highest percentage of mononuclears in these cases. The high numbers together with extreme mononucleosis such as 99 per cent., which are common in lymphoid leukæmia, never occur in glandular fever.

TABLE I.—*Hyperleucocytosis*

Author.	Age.	Total leucocytes.	Mn. per cent.
Feer	1 year	63,000	81
de Bruin	1½ years	63,000	78
Nelken	4 ,,	58,000	59
Feer	1 year	54,500	64
Price	7 months	44,000	84
de Lange	10 ,,	41,200	85

Mn. = Mononuclears.

Morphology of Polynuclear Cells.—Examination of the nuclei shows frequently a "shift to the left"—that is, towards more primitive cells. This suggests a strain on the myeloid tissues of the bone-marrow. The marrow, however, cannot be exhausted or aplasic as it is capable of responding, at least temporarily, with a polynucleosis to an ordinary infection such as otitis media, or a stimulus such as milk injections. The eosinophils are stated by some authorities to be low in the early stages and high in convalescence, but from a study of the figures it does not seem possible to form any definite conclusions.

TABLE II.—*Glandular Type: Polynucleosis*

Author.	Age.	Glands palpable.	Day of blood count.	Leucocytes.	Pn. per cent.
Scheer ..	6 mos.	Onset	3	13,200	71
Tidy ..	9 yrs.	2	4	31,000	79
			7	27,500	78
			20	10,300	30
,, ..	9 ,,	Onset	2	15,600	76
			5	6,200	36
,, ..	10 ,,	,,	24*	19,000	73
Baldridge	*19* ,,	,,	2	*15,000*	85
			9	6,400	73
			12	8,400	51
			21	7,700	37

* Relapse. Pn. = Polynuclears.

Polynuclear Cells: Polynucleosis.—A definite polynucleosis may be present in the prodromal and initial stages of the glandular type (Guthrie and Pessel, Scheer, Tidy). As an absolute lymphocytosis is the outstanding feature and usual criterion of glandular fever, it is important to note this. In the febrile and anginose types nothing is known of the blood at the onset. In the anginose type lymphocytosis has always been present by the time the faucial changes have developed.

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* The Lumleian lectures for 1934, delivered to the Royal College of Physicians of London on March 15th and 20th.

n the glandular type in a boy under me, aged years, at the first count, the leucocytes were 600 and the polynuclears 85 per cent. He com- ined of a sore-throat, but the glands had not arged at that time.

Although usually the polynucleosis disappears idly at the time of the glandular enlargement, it y sometimes, especially if severe, persist for a few 's. Illustrations of polynucleosis at different ages given in Table II., including one case during a rudescence of the glandular enlargement. The e with 31,000 leucocytes and 79 per cent. of poly- clear cells was undoubtedly glandular fever.

Polyneucleosis only occurs in the initial stage, ver developing during the course, and is always nsient. The extreme instances of hyperleuco- tosis given in the previous section also occurred ly in the attacks, the numbers always subsequently ling.

TABLE III.—*Leucopenia and Neutropenia*

uthor.	Age.	Bd. Ct. day.	Total leuco-cytes.	Poly-nuclears.	Mono-nuclears.	Glands day.	Clinical type.
chmid-hemy	34	12	2,000	8 (160)	92 (1840)	12	Febrile (jaundice)
		21	8,700	45 (3,900)	55 (4,800)		
		38	5,600	54 (3,000)	41 (2,300)		
owney	22	6	3,000	—	—	—	Glandular
		7	4,500	13 (600)	86 (3,900)	1	
Glanz-mann	2	1	3,000	42 (1,250)	58 (1,750)	1	Glandular anginose
		6	12,000	32 (3,900)	68 (8,100)		
ongcope	30	6	3,000	57 (1,700)	43 (1,300)	22	Febrile (and rash)
		7	3,400	60 (2,050)	40 (1,350)		
		16	9,800	44 (4,300)	56 (5,500)		
		22	8,800	29 (2,550)	71 (6,300)		
		32	7,800	32 (2,500)	68 (5,300)		
Glanz-mann	1	3	3,000	25 (600)	75 (2,400)	1	Glandular
Becker	25	1	3,800	42 (1,600)	58 (2,200)	1	Glandular (and rash)
		15	12,000	25 (4,000)	75 (8,000)	1	
Glanz-mann	4½	3	10,000	9 (900)	91 (9,100)	1	Glandular (and rash)
		4	6,300	4 (250)	96 (6,000)		
		10	7,000	9 (630)	91 (6,400)		
		16	6,500	27 (1,750)	73 (4,750)		
		31	8,000	24 (1,900)	76 (6,100)		

Leucopenia.—Low total counts below 4000 per c.mm. re rare, the recorded cases being given in Table III. 'he leucopenia occurs only at the onset or early in he attack; it never develops during the course, hus resembling the polynucleosis. It is essentially ue to diminution of the polynuclear cells and the otal number always rises later. The neutropenia is xtreme in several instances. Clinically the course s often severe and atypical.

Extreme neutropenia may also occur with an bsolute lymphocytosis, as in Glanzmann's case in 'able III. All these cases recovered. Lymphopenia, n absolute reduction of mononuclear cells, is not ecorded.

During convalescence, and often for long periods ubsequently, a slight leucopenia is common. This is mainly due to reduction of polynuclear cells, and thus is associated with an increased percentage of lymphocytes.

Variations in Polynuclear Cells.—The polynuclear cells thus appear to react early to the virus, resulting in an initial polynucleosis or occasionally a neutropenia. In either event, at the end of a few days, the polynuclears tend to be at or somewhat below normal. Subsequently they vary round this figure.

Mononuclear Cells.—The lymphocytosis and the glandular enlargement usually develop together on or about the same day in all types. It may, however, precede the glandular enlargement by a day or two, while occasionally, as noted previously, an early polynucleosis may overlap the adenitis. The lymphocytosis may develop in the space of a day or two.

The lymphocytes reach their maximum at most a few days after the first development of lymphocytosis. The polynuclears may by that time have reached their minimum, so that the relative percentage of mononuclears becomes very high. The lymphocytes then commence to diminish, at first rapidly for a few days, and then more slowly. In Table IV. are examples of typical courses. No. 1 is a case of Sprunt and Evans. Nos. 2 and 3 were cases under me exhibiting an early normal count.

TABLE IV.—*Glandular Fever: Normal Course*

Case.	Age.	Illness day.	Total leucocytes.	Poly-nuclears.	Mono-nuclears.
1	21 yrs.	1	7,800	25 (1,950)	75 (5,850)
		4	18,800	23 (4,500)	77 (14,300)
		7	17,400	34 (6,000)	66 (11,400)
		8	10,800	39 (4,200)	61 (6,600)
		13	11,200	58 (6,400)	42 (4,800)
		18	8,200	54 (4,400)	46 (3,800)
		25	8,100	65 (5,300)	35 (2,900)
		36	9,800	71 (6,900)	29 (2,900)
		66	9,000	73 (6,600)	27 (2,700)
2	12 yrs.	2	5,200	63 (3,300)	37 (1.900)
		4	13,500	36 (4,900)	64 (8,600)
		25	11,000	52 (5,700)	48 (5,300)
		40	6,600	52 (3,400)	45 (2,800)
3	23 yrs.	6	6,800	64 (4,300)	36 (2,500)
		9	12,400	38 (4,700)	62 (7,700)
		14	11,200	24 (2,700)	76 (8,500)
		18	9,600	34 (3,200)	66 (6,400)
		26	6,800	52 (3,600)	48 (3,200)

The degree of lymphocytosis does not show any direct relation to the size of the glands, but in an individual case the lymphocytosis approximately follows the same course as the glands, and persists or falls with them. It has been known, in many cases, to persist over long periods, even several years.

The highest percentage of mononuclear cells recorded is 97·5. The leucocytes numbered 20,000 (Ireland). Figures of 99 per cent., such as occur commonly in lymphoid leukæmia, are never found. All percentages over 90 are rare; figures between 70 and 80 per cent. are common, but 60 and 70 per cent. are even more frequent.

The mononuclear cells appear to react less rapidly than the polynuclears and are little altered during what may be called the febrile stage. But with the occurrence of glandular enlargement, affection of the mononuclears is constant.

Morphology of Mononuclear Cells.—The mononuclear cells in glandular fever are extremely varied in type. With regard to their morphology the following general points may be stated:—

(1) The mononuclear cells are not myeloid in origin.

(2) Numerous types of abnormal mononuclear cells are usually present simultaneously. This is in marked contrast to lymphoid leukæmia.

(3) The predominant cell may be different in different cases; it may also change with great rapidity in the course of an individual case.

(4) Similar forms occur in all types of glandular fever.

The nature of some of the abnormal cells is difficult to decide. Observers are in substantial agreement as to their appearance and staining reactions, but differences arise as to their classification and origin, and as to whether certain cells are lymphocytes or "monocytes." A monocyte in this sense is a cell which we commonly call a plasma cell, the origin of which is supposed to be from reticulo-endothelium.

In the blood films grades of lymphocytes can be traced, varying more and more from the normal and approaching more and more to the characteristics of plasma cells. It cannot be said that a point can be fixed beyond which it is impossible for an abnormal lymphocyte to pass, and that all cells beyond it must be plasma cells. Certainly no two authorities would agree on the same point. I have carefully studied the cells in many cases of glandular fever and cannot recognise any criteria by which certain abnormal forms of lymphocytes and monocytes can be differentiated. Supravital staining (McLean, Wilson and Cunningham, Lawrence and Todd) unfortunately leaves one in doubt at exactly the same point as other methods.

Probably cells, typical and atypical, are present from both forms of tissues, and certain atypical cells of the two groups are indistinguishable. This accords with recent histological studies of glands which suggest stimulation both of the lymphoid and reticulo-endothelial tissues.

Classification of Mononuclear Cells.—The mononuclear cells occurring in glandular fever may be divided into three groups:—(1) Normal lymphocytes. Some normal cells are always present and may form a high percentage. As convalescence sets in there is a return to predominance of small lymphocytes. (2) Primitive lymphocytes. (3) Abnormal mononuclears.

Primitive Lymphocytes.—There are two common types, both of which are known as either "lymphoblasts" or "leucoblasts." (*a*) Large cells with clear, slightly basophilic cytoplasm. No azur granules. Vacuoles usually absent but occasionally present. The nucleus is pale, may be slightly irregular with fine chromatin and no nucleoli. (*b*) Large cells with cytoplasm distinctly basophilic, but staining irregularly. In the nucleus one or often more nucleoli are usually present; the chromatin is irregularly distributed, and the nucleus stains dark.

Abnormal mononuclear cells are of such varying types that one can only *indicate the points on which they differ* from the normal. Practically all combinations of such variations can be observed. (1) Size: larger than normal. (2) Shape of nucleus: may be round, oval, or bean-shaped, or may be markedly indented as in the Rieder cell or normal large mononuclear. (3) Chromatin of nucleus: no standard type; network often irregular. (4) Staining of nucleus: darker than normal. (5) Cytoplasm: stains more basophilic than normal. Vacuoles may be present, sometimes to a marked degree.

The commonest predominant cell is somewhat larger than a small lymphocyte; the cytoplasm is more basophilic than a normal large lymphocyte, and the nucleus is darker and indented.

Combinations of the variations classified above, in their advanced forms, give cells resembling (or identical with) normal or abnormal plasma cells.

BLOOD CHANGES IN FEBRILE TYPE

There is little knowledge as to the course of the blood changes in the early stages of this type. Table V. contains all the reliable examinations which I have been able to find. Many counts were made under a diagnosis of typhoid and were not repeated.

In Stage 2 there is slight but definite indication of lymphocytosis. In Stage 3 lymphocytosis invariably develops. Its subsequent course is the same as in the glandular type, but is more prolonged with the continuation of the pyrexia and enlarged glands.

TABLE V.—*Febrile Type: Typical Course*

Day of illness.	Author.	Age.	Rash (day)	Glands (day).	Bd. Ct. (day).	Total leucocytes.	P.M.N	Mn.
5–10	Longcope	30	5	22	6	3,000	57	43
					7	3,400	60	40
					10	5,400	54	46
	Mills	19	—	16	7	8,200	42	52
11–15	Mills	19	—	16	14	8,200	41	53
	,,	20	8	20	15	14,000	48	52
	,,	21	8	20	15	Normal		
	Benson	—	6	10	11	14,700	18	82
	Tidy	26	4	10	12	33,000	5	95
					14	32,000	6	94
16–20	Longcope	30	5	22	16	9,800	44	56
	Tidy	30	5	24	16	7,000	70	30
21–30	Mills	19	—	16	21	12,000	29	65
	Longcope	30	5	22	22	8,800	29	71
	Tidy	23	6	15	23	11,600	34	66
	,,	19	4	18	24	11,700	36	64
	,,	40	5	24	27	13,000	43	57
	,,	26	4	10	27	29,000	12	88

Atypical cases of the febrile group occasionally occur, in which the development of rash and glands are not in the usual order or stages. Blood counts from a few such cases are given in Table VI. The blood is as erratic as the clinical features but the general lymphocytosis accompanies the glandular enlargement.

TABLE VI.—*Febrile Type: Atypical Courses*

Author.	Age.	Rash (day).	Glands (day).	Bd. Ct. (day).	Total leucocytes.	Polynuclears.	Mononuclears.
Glanzmann	5	1	3	1	17,600	68	32
				3	7,000	30	70
,,	6	3	3	3	7,000	20	80
Tidy	14	3	1	2	8,600	68	31
				6	7,000	60	40
				18	13,500	46	53
Becker	25	15	1	1	3,800	42	58
				15	12,000	25	75
Rosenthal	26	11	10	11	11,600	35	65
Tidy	43	7	3	8	11,600	75	25
				19	8,700	62	38

BLOOD CHANGES: GENERAL CONCLUSIONS

The myeloid tissue is affected from the onset. It may react initially either by a polynucleosis or a neutropenia. In either case the total number quickly returns to about normal figures.

The lymphoid tissue appears to respond to the infection less rapidly, though finally to a greater degree. Both the type of cells and the morbid histology of glands suggest that all mononuclear cell tissue is affected.

The suggestion that the blood changes are due to the circulation being flooded with lymphocytes from the enlarged glands cannot explain the early polynucleosis, or the leucopenia with neutropenia, or such a count as 6000 leucocytes with 96 per cent. lymphocytes. It is evident that the virus of glandular fever transiently affects all the blood-forming tissues, and no single blood picture is typical of the disease.

Pathogenesis

The Virus.—Bacteriological examinations of the blood, glands, and emulsions of the glands have been uniformly negative except for a few results which may be ascribed to secondary invaders or contaminations. Nyfeldt's "Bacterium monocytogenes hominis" has not been confirmed. Spirochætes are not present. Streptococci and Vincent's organisms have been isolated repeatedly from the fauces but are not seriously considered as the cause.

With regard to animal experiments, only Bland's investigations are promising. During the 1930 epidemic he injected patient's blood into rabbits. Results were negative except when the blood was taken during the febrile period in the early stages. Such inoculations produced a rapidly fatal febrile disease, and could be transmitted to other rabbits. The infection could be transmitted to monkeys, in which it produced a disease with fever, enlargement of lymphatic glands, and a mononucleosis with primitive lymphocytes. A protozoon of the genus toxoplasma was identified. Toxoplasmosis is natural to many animals, including rabbits, but Bland states that this cannot be transmitted to monkeys. Unfortunately febrile cases are rarely diagnosed in the early stages, except during an epidemic, and Bland has had no opportunity of continuing this work. The question whether this is a specific toxoplasma remains undecided.

Heterophile Antibodies.—The presence of heterophile antibodies in glandular fever is a curious phenomenon discovered by Paul and Bunnell. The amount present in glandular fever was consistently and markedly in excess of that in any other condition examined, with the exception of one unclassified blood change. Sprunt states that these results have been confirmed at Johns Hopkins Hospital. Further investigations are required.

Diagnosis

Glandular fever is a febrile disease with general glandular enlargement and lymphocytosis. When the characteristics are present and recognised the diagnosis is easy. It may, however, be difficult or temporarily impossible before the characteristics have developed or in the presence of certain special features. The special difficulties are here discussed.

GLANDULAR TYPE

(1) *Acute Lymphoid Leukœmia.*—This is rarely difficult; in glandular fever the patient is not seriously ill, there is no anæmia, many types of mononuclear cells are present simultaneously, the total and differential counts do not reach the figures usually present in leukæmia, and recovery is rapid.

(2) *Sepsis and Mumps.*—In glandular fever there may be slight swelling of the skin over a mass of glands in the neck and polynucleosis may be present temporarily. In such circumstances there may be temporarily a close resemblance to sepsis or (except for the blood) to mumps at its onset. Definite œdema and a mass suggestive of sepsis or mumps does not occur, and the parotid gland is never affected.

There should be no confusion with tuberculosis, Hodgkin's disease, or syphilis.

ANGINOSE TYPE (MONOCYTIC ANGINA)

(1) *Diphtheria.*—Glandular fever angina differs clinically from diphtheria in the long prodromal period, the long febrile course which may occur, in the general glandular and splenic enlargement, and in its mild constitutional effects, and in the tendency to recurrences. In diphtheria there is an absolute polynucleosis increasing with the severity of the infection which never alters to a lymphocytosis.

(2) *Vincent's angina* does not cause a membranous condition or lymphocytosis.

(3) *Scarlet fever* produces a persistent polynucleosis. Rashes are practically unknown in anginose glandular fever.

FEBRILE TYPE

Diagnosis from typhoid and various fevers may be impossible until the glands and lymphocytosis develop.

The visceral types which have been mentioned are an obscure group. Diagnosis rests on the absolute lymphocytosis.

ERUPTIONS

(1) *Maculo-papular Eruption.*—The diagnosis clinically from typhoid may be temporarily very difficult.

(2) *Rubelliform Eruption.*—In rubella it is generally accepted that the leucocytes are below normal numbers and the plasma cells are especially increased, while glandular enlargement rarely includes the axillary group. Glanzmann believes that the diagnosis may be impossible.

It is possible that in the heterogeneous group of conditions, which Duke described as "fourth disease," are included cases of glandular fever.

BLOOD CHANGES

It is suggested that there is a closely allied group of "lymphotropic viruses" which produce lymphocytosis (Schwarz and Lehndorff). The group would include whooping-cough, mumps, glandular fever, and rubella; no doubt there are others, possibly Mossman river fever and Haberfeld's disease. The blood changes of glandular fever may approximate to agranulocytosis, which probably is not a single entity.

Treatment and Prophylaxis

Treatment is purely symptomatic. In simple cases of the glandular type the patient should be kept in bed until the temperature is normal and the main mass of glands has subsided. In prolonged febrile types some general exhaustion may develop and need nursing on the usual principles in pyrexial states. Attempts at specific treatment with intravenous injections of arsenical preparations or mercurochrome have proved valueless. Diphtheria antiserum is useless.

During convalescence tonics and iron are indicated. School-children often exhibit some degree of debility for six months or a year. They are fit for ordinary school routine but should not be unduly blamed for falling below their usual mental and physical standard.

Isolation should be carried out in accordance with the dictates of common-sense for a disease which is undoubtedly infectious, but only of a moderate degree of infectivity and with a favourable prognosis. It is clear that the infectivity is greatest in, and possibly even confined to, the first few days, and that children are more susceptible than adults.

With regard to schools it should be remembered that a single case with reasonable precautions rarely infects other members of a family household, but that two or three cases together in a school will commonly result in the infection of most of the children.

Conclusions

1. Glandular fever is an acute infectious disease, characterised by fever, glandular enlargement, and blood changes (especially mononucleosis), and sometimes by severe faucial changes. No age is immune, but children are most liable to infection.

2. Three principal clinical types can be recognised: (1) glandular or Pfeiffer's type; (2) anginose type (monocytic angina); (3) febrile type.

3. Suppuration of glands is very rare.
4. Eruptions are common in the febrile type and its variations. The usual forms are maculo-papular, resembling typhoid, and rubelliform, especially in children.
5. All blood-forming tissues are affected. The myeloid tissues tend to react more rapidly, producing initial transient polynucleosis or neutropenia. The lymphoid tissues react more slowly producing mononucleosis. The total leucocytes rarely exceed 40,000 per c.mm. but may reach 60,000 in young children.
6. The mononuclear cells are increased both relatively and absolutely. Numerous types of abnormal mononuclear cells tend to be present simultaneously. The abnormal cells may represent any or every type from lymphocytes to plasma cells (monocytes). The predominant cell may vary in different cases, and may alter in type in the course of an individual case.
7. The prognosis is favourable and the mortality in healthy subjects is negligible.
8. The virus is unknown but is probably transmissible to monkeys.

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TWO CASES OF BASOPHIL ADENOMA OF THE PITUITARY GLAND

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THERE is a certain inconstancy in the clinical features that are held to be characteristic of the condition described by Cushing (1932, 1933) as "pituitary basophilism." In his latter paper Cushing identified the syndrome in 14 cases with verified pituitary adenomata. In 4 of these the adenoma appears to have been other than basophil.

Accepting the remaining 10 cases and adding the subsequently reported cases of Kepler et al. (1933, 1934) and of Craig and Cran (1934) it appears that the most constant clinical features are as follows: (1) adiposity of face and trunk (11 positive, 1 negative); (2) hirsuties (11 positive, not mentioned in 1—the only male subject); (3) amenorrhœa or impotence (9 positive, irregular menstruation in 1, hysterectomy had been performed in 2); (4) osteoporosis (9 positive, not mentioned in 3); (5) raised blood pressure (8 positive, not mentioned in 4); (6) striæ atrophicæ of the abdominal skin (7 positive, not mentioned in 5). A less constant feature is: (7) glycosuria (4 positive, 3 negative, not mentioned in 5). In Cushing's first paper he also notes as characteristic of the syndrome "a tendency to erythræmia, a count exceeding 5 millions having been present in five of the nine cases in which blood counts were recorded." Perusal of the case reports shows, however, that in two only did the red cell counts exceed 5 millions and in neither was a basophil adenoma demonstrated. In one of the proved cases of basophil adenoma the red cell count "approximated 5 millions" while in the rest it was either below this level or was "normal." Of subsequently reported cases there is a note of the blood count in 7. In 1 case only (Moehlig, 1932) did the red cell count appreciably exceed the range of 3,940,000 to 6,080,000 for normal women (Vaughan, 1934). In this the count was 6,850,000. In Craig and Cran's case the count was 6,190,000. In the other 5 cases it did not exceed 5,290,000.

The first of the following two cases is interesting not only as the second verified case in a male subject but also because several atypical features have emerged in the course of the examination. The second case, in a female, is of importance because so few of the features regarded as characteristic of the syndrome were present.

The First Case

CLINICAL

A male aged 31, a commercial traveller, was first admitted to the London Hospital on March 15th, 1932 (Reg. No. 30414, 1932, Med.), under the care of Prof. Arthur Ellis. He complained of intermittent headaches and occasional attacks of epistaxis during the previous three years. At the onset of these symptoms he had begun to get stout and his weight had increased in about twelve months from 69·85 to 84·82 kg (Figs. 1 and 2). The greater part of this increase in weight was, however, lost during the next two years, and by the time he came under our observation it was 73·48 kg. His wife had noticed that the adiposity was mainly about the face and abdomen. One year before admission he had noticed swelling of the ankles, shortness of breath, and nocturnal frequency. At this time he had been told that his blood pressure was high. Three months before admission he had begun to get severe morning headache associated with vomiting.

He was a married man but his wife had had no children and there had been no miscarriages. During the year before admission there had been impotence. He had never complained of any disturbance of vision, nor had he ever noticed any hæmaturia. At the age of ten he had been in hospital with enteric fever; the urine at that time was reported as clear.

On examination he was an obese, plethoric man with a red face and highly coloured mucous membranes. The distribution of hair and the external genitalia appeared normal. The adiposity was most obvious in the lower part of the face and in the abdomen; in the skin of the abdominal wall there were conspicuous striæ atrophicæ. There was no demonstrable œdema. The heart was definitely enlarged, the apex-beat being well outside the nipple line; the blood pressure was 210/140 mm. Hg. Examination of the fundi showed a well-marked albuminuric retinitis: "there was marked arterial thickening, multiple small retinal hæmorrhages, many small glistening patches, and also larger and softer patches of exudate" (Mr. Charles Goulden). *Urine:* persistent cloud of albumin; no macroscopic hæmaturia; a few leucocytes and red corpuscles with occasional granular and hyaline casts in deposit; specific gravity 1010 to 1025 with no tendency to fixation. The daily volume excreted varied up to 78 oz. *Renal function:* blood-urea, 0·036 per cent.; phenolsulphonephthalein, 19·1 per cent. in two hours; urea excretion, 73 per cent. of normal. *Blood count:* red cells, 5,600,000; hæmoglobin, 88 per cent.; colour-index, 0·78; white cells, 7000.

The patient was observed in hospital for five weeks. The combination of headache, obesity, and impotence suggested the possibility of an adenoma of the pituitary gland, but a radiological examination of the skull revealed no abnormality. The renal function tests were repeated several times and always yielded results within the limits of normal. A diagnosis of hyperpiesia was therefore made, the retinal changes suggesting a malignant hypertension. For a time he responded to treatment with luminal, venesection, and restricted diet. The blood pressure came down to 160/120 mm. Hg and his weight was reduced to 63·67 kg. After discharge he was seen at the nephritis clinic by one of us (H. E.) at frequent intervals during the following sixteen months. He continued to complain of headache, giddiness, and insomnia, and later of precordial pain, dryness of the mouth, and thirst. On one occasion only (Feb. 3rd, 1933) did he complain of pain in the back. The blood pressure remained round about 210/130 mm. Hg. Towards the end of July, 1933, the dyspnœa and precordial pain became more intense, and spontaneous purpuric hæmorrhages appeared in the skin of both legs.

On August 8th he was readmitted to hospital. *On examination* he was very distressed and dyspnœic. The tongue was dry and furred. There was no œdema. Large purpuric hæmorrhages were present in the skin of both legs. The blood pressure was 205/145 mm. Hg. Otherwise the physical signs were as before. There was no definite clinical evidence of heart failure. *Urine:* cloud of albumin; no macroscopic hæmaturia; specific gravity, 1005–1015; daily volume up to 49 oz. *Renal function:* blood-urea, 0·12 per cent.; phenolsulphonephthalein, a trace in two hours; urea clearance, 22·8 per cent. of normal. *Blood count:* red cells, 3,200,000; hæmoglobin, 30 per cent.; colour-index, 0·47; white cells, 5600. He was temporarily relieved by venesection but died in uræmia one week after admission.

SUMMARY OF NECROPSY

Nephritis repens with very great cardiovascular hypertrophy. Basophil adenoma of pituitary gland. (P.M., 351, 1933.)

Moderate general atheroma. Degenerations, necroses, and formative changes in arteries of kidneys, pancreas, suprarenal bodies, spleen, myocardium, and liver. A few focal areas of degeneration, necrosis, and hæmorrhage in suprarenal bodies, and of necrosis and interstitial fibrosis in pancreas, due to arterial changes. Œdema and post-mortem digestion of pancreas. Œdema, focal areas of engorgement, and slight chronic inflammation of pulp of spleen. Lipochromic and slight fatty degenerations of centres of lobules of liver. Partly organised vesicular hæmorrhages, œdema, and collateral emphysema in lungs. Many hæmorrhages (up to 5·5 × 4 cm.) in skin of trunk and limbs, especially legs. Many striæ atrophicæ in skin of abdomen. Excess of subcutaneous fat (up to 3·5 cm. thick) in abdominal wall. No excess of fat on limbs. Normal amount of hair of male distribution. No deformity of spine. Teeth sound. No abnormality in bones. Red, adipose-hæmopoietic marrow in ribs, vertebral bodies, and upper three-quarters of shaft of femur. Œdema of active testicles. Normal thyroid and parathyroid glands. Thymus obscured by adipose tissue. Œdema of brain. Mucous catarrh and congestion of stomach. Internal hæmorrhoids. Caseous tuberculous nodule (0·5 cm. diam.) in lower lobe of right lung. A few hæmangeiomata (up to 0·5 cm. diam.) in liver.

Weights: body, 60·84 kg. (height, 1·668 m.); heart, 687·5 g.; liver, 2239·6 g.; kidneys, 326 g.; spleen, 269·3 g.; brain, 1289·9 g.; pancreas, 83 g.; suprarenal bodies, 20·8 g.; testicles, 47·7 g.; thyroid gland, 16·75 g.; pituitary gland, 0·7 g.

MACROSCOPIC EXAMINATION

The *pituitary gland* was of normal size (1·4 × 1·15 × 0·9 cm. deep). The angle between the anterior and right borders of the gland was occupied by a projecting opaque creamy-white nodule (up to 0·6 cm. from side to side × 0·4 cm. from before back × 0·65 cm. from above downwards), which on section was greyish-white and sharply circumscribed. The posterior lobe was very small and was partly separated from the anterior lobe by a cyst (0·3 × 0·2 cm.) containing clear honey-like material.

The *kidneys* were of normal size with pinkish-red subcapsular surfaces, which were studded with yellowish and greyish-white granules and a few petechiæ. The cortex was narrow and its pattern blurred. The glomeruli appeared prominent. The demarcation of cortex from medulla was indistinct. The arcuate arteries were abnormally conspicuous. The *suprarenal bodies* were large but did not exceed the limits of normal as they represented 0·0341 per cent. of the body-weight (see figures in Leyton, Turnbull, and Bratton, 1931). The cortex contained abundant lipoid and a conspicuous pigment zone. No adenomata were seen. The medulla was scanty. Three *parathyroid glands* were identified. They measured: (1) 0·6 × 0·45 × 0·4 cm.; (2) 0·6 × 0·5 × 0·4 cm.; (3) 0·65 × 0·4 × 0·3 cm.

MICROSCOPIC EXAMINATION

The pituitary gland was divided horizontally into two parts, embedded in paraffin and sectionally serially. The first sections were stained with Ehrlich's hæmatoxylin and eosin, Weigert's iron hæmatoxylin and van Gieson's mixture, Weigert's fuchselin and neutral red. The remaining sections were stained with Mallory's acid-fuchsin aniline-blue. Other tissues examined were as follows: parathyroid, thyroid, pineal, and both suprarenal glands; thymus, testis, tail of pancreas, both kidneys, lung, myocardium, spleen, liver, skin, marrow of femur, lumbar lymphatic gland, cervical sympathetic ganglion, and arch of aorta. The staining methods used were the first three of those enumerated above. Portions of the fifth rib, head and shaft of femur, and a lumbar vertebra were decalcified in Müller's fluid for three months followed by 0·5 per cent. nitric acid in 4 per cent. saline formaldehyde. Herxheimer preparations for fatty substances were made of spleen, both kidneys, liver, myocardium, left suprarenal gland, and aorta.

The pituitary gland.—The nodule in the anterior lobe is a mass of basophil cells enclosed by a zone of stout collagen fibres (Fig. 3). The cells are of approximately normal size. In many places their borders are indefinite and the appearance is suggestive of a syncitium. Some of the cells have two or three nuclei. The cytoplasm of nearly all the cells is crowded with coarse basophil granules. The few cells in which these granules are absent are the smallest; they cannot be distinguished from ordinary chromophobe cells. The rest of the gland appears normal. A cyst, filled with hyaline eosinophil material and lined with a low cubical epithelium, occupies the pars intermedia and projects into the posterior lobe. The posterior lobe is small and contains a few groups only of basophil cells in the part that abuts on the pars intermedia.

The kidneys show an advanced stage of chronic Bright's disease of the kind that has been designated by one of us (Russell, 1929) as nephritis repens, type 4. The vascular changes in these and in the other organs of the body will be dealt with in a future paper; we believe them to be an association of toxic nephritis.

The lungs.—In portions of the upper lobes of the right and left lungs that had shown ill-defined finely granular areas of consolidation to the naked eye large groups of bronchioles, alveolar passages and infundibula contain red corpuscles and fibrin. The margins of these plugs of exudate are occasionally infiltrated with fibroblasts, and in a few respiratory bronchioles the whole plug is replaced by fibroblasts and collagen fibrils. Elsewhere the vesicular tissue contains albuminous coagulum or is distended by emphysema. There is no general congestion of the grade seen in "back pressure" lungs. There are no recognisable abnormalities in the blood-vessels.

Petechia in skin of chest.—A mass of red corpuscles and relatively abundant fibrin lies in the lower margin of the dermis. There are no recognisable abnormalities in the vessels.

Endocrine glands.—The cortex of the *suprarenal bodies* is loaded with lipoid. The normal pattern of cortex and medulla is preserved except where, in the cortex, focal areas of degeneration, necrosis, and hæmorrhage result from lesions of the capsular arterioles. Dr. H. W. C. Vines has kindly stained a section by his ponceau-fuchsin method (Broster and Vines, 1933) and finds that the reaction is negative. The islets in the tail of the *pancreas* appear unaltered. A few focal necroses and areas of increase of collagenous stroma in other parts of the gland are referable to the vascular changes present. In the *testis* spermatogenesis is in active progress and spermatids and spermatozoa are numerous. There is great rarefaction of the interstitial tissue by œdema. The interstitial cells are sparse and scattered in small groups. Almost all the vesicles in the *thyroid gland* contain colloid and many are considerably distended therewith. There is very little sign of active secretion. The *thymus* is represented by slender branching cords of thymic reticulum. These contain a very few Hassal bodies and several calcareous spheres, and are expanded in a very few spots by small focal areas of lymphoid infiltration. The *pineal and parathyroid* glands appear normal.

Bones.—There was no abnormality in the histological structure of the bone. Adipose tissue is in considerable excess of hæmopoietic in the red marrow of the femur, but in slight minority in the rib and vertebra. The hæmopoiesis is normal in character.

The Second Case

CLINICAL

A married woman of 33 was admitted to the London Hospital in coma during the night of Jan. 19th, 1934, shortly after the onset of a stroke (Reg. No. 40122, 1934, Med.). She was very obese, the fat being of general distribution and not sparing the limbs. Respiration was stertorous. The left pupil was first contracted but later dilated and fixed. The right pupil was dilated and fixed. There was weakness of the right side of the face. An extensor plantar reflex was obtained on the right side. The systolic blood pressure was 240 mm. Hg. Blood-stained fluid was obtained by lumbar puncture. Death took place 90 minutes after admission. The clinical diagnosis was cerebral hæmorrhage.

The husband said that obesity dated back to school-days when the patient had been nicknamed "Fatty." He produced photographs of her at the ages of 14 and 16 in confirmation of this. They had been married ten years and there had been three pregnancies. The first child, born nine years ago, was premature at seven months and died a few days after birth. The second child, born seven years ago, is alive and well. The third pregnancy, four years ago, was terminated between the fifth and sixth months in Guy's Hospital by Cæsarean section. Sterilisation was also carried out. Since that time the menses had been regular to within a day or two of the month, and the patient had led an active, normal life. She did not complain of any symptoms such as headache or backache. Photographs at different periods of her married life showed a physical appearance closely resembling that at the time of death.

Through the kindness of Mr. J. B. Blaikley, obstetric registrar at Guy's Hospital, the following particulars have been obtained concerning the patient's obstetric history. The first two pregnancies had been complicated by œdema and albuminuria. She was said to have been blind for three days at some period during the first pregnancy and to have had mistiness of vision during the second. On Oct. 21st, 1929, she attended her private doctor at the fifth month of her third pregnancy complaining of headache, swelling of the ankles, and nocturia. On Oct. 29th she was admitted to Guy's Hospital where she was found to have œdema and albuminuria. The blood pressure before operation varied from 200/160 to 175/128 mm. Hg. Blood-urea: 0·023 per cent. Urine: albumin from 6 to 15 Esbach units; no macroscopic blood nor pus; numerous hyaline and granular casts in the deposit. A catheter specimen (Oct. 30th) showed a few epithelial cells and occasional leucocytes in the deposit. On Nov. 7th abdominal hysterotomy and sterilisation was performed. Her subsequent progress was good. The blood pressure fell to 130/85 mm. Hg on Nov. 12th, and at this time there was only ¼ Esbach unit of albumin in the urine. Subsequent daily readings showed, however, a steady rise of blood pressure and on Nov. 26th she was discharged with a trace of albumin in the urine and a blood pressure of 164/130 mm. Hg.

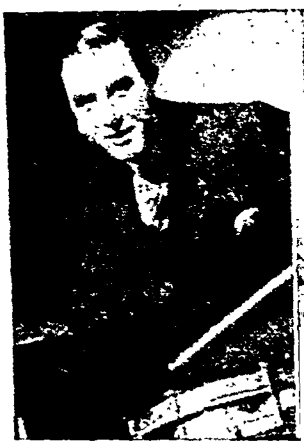

FIG. 1 (Case 1).—The patient five years before his illness.

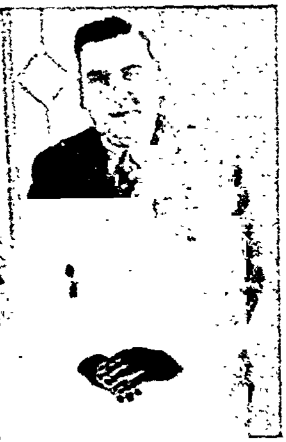

FIG. 2.—Appearance at the height of adiposity.

SUMMARY OF NECROPSY

Pontine hæmorrhage. Cardiovascular hypertrophy. Hyperpiesia. Basophil adenoma of pituitary gland. (P.M., 30. 1934.)

Extension of hæmorrhage in pons to cavity of fourth ventricle and along right crus to lower part of right internal capsule. Great hypertrophy of heart, especially of left ventricle. Moderate general atheroma. A few scattered fat flecks in cerebral arteries. Congestion and slight ischæmic fibrosis of kidneys. Congestion of lungs. Diffuse congestion and œdema of liver. Slight microscopic infiltration of portal systems with small lymphocytes and eosinophil leucocytes. Œdema and congestion of spleen. Œdema, congestion, and extensive post-mortem digestion of pancreas. Post-mortem digestion of body of stomach. Slight chronic cystitis and hypertrophy of urinary bladder. A few fibrous pleural adhesions over middle of outer surface of right lung. Obliteration by fibrous tissue of terminal 7 cm. of 9 cm. appendix. Scar of old Cæsarean section in body of uterus. Scar in left side of external os. Operative removal of Fallopian tubes. Graafian follicles and follicular cysts in ovaries; recent corpus luteum in left ovary. No abnormality in bones. Red marrow (sinks) in upper half and (floats) in remainder of shaft of femur except lower ninth; red marrow in ribs and sternum. Abundant hair over central third of abdomen between umbilicus and pubis, and on upper anterior and inner aspect of thighs. Short black hair in axillæ. Moderate amount of short dark hair on upper and lower lips. Broad black eyebrows. Numerous striæ atrophicæ in skin of lower abdominal wall. Slightly raised melanoma ([illegible] cm. diam.) on outer aspect of left thigh. Very [illegible] black-haired woman with full round face and no obvious plethora.

Weights: body, 84·48 kg. (height, 1·524 m.); heart, 567 g.; liver, 1410·4 g.; kidneys, 318·9 g.; spleen, 233·9 g.; brain, 1452·9 g.; pancreas, 102·3 g.; suprarenal bodies, 14·9 g.; ovaries, 30·8 g.; thyroid gland, 37·3 g.; pituitary gland, 0·9 g.

MACROSCOPIC EXAMINATION

The *pituitary gland* was large (1·3 × 1·4 × 0·75 cm.), but not abnormally so for a multipara. On section the anterior lobe appeared relatively large in comparison with the posterior lobe and had a smooth terra-cotta cut surface. No adenoma was recognised with the naked eye. The *suprarenal bodies* were of normal size, representing 0·0176 per cent. of the body-weight. The cortex contained abundant lipoid and a conspicuous pigment zone. Two or three pinhead cortical adenomata were present in the capsule of the left suprarenal body. The *thyroid gland* appeared to be somewhat bulky and showed a glistening cut surface. The *thymus* contained a moderate amount of visible glandular tissue embedded in a large amount of fat. Three *parathyroid glands* were identified (left upper: 0·7 × 0·4 × 0·15 cm.; left lower: 0·6 × 0·5 × 0·75 cm.; right upper: 0·5 × 0·4 × 0·15 cm.). The *uterus* was rather large. The body was 5·5 cm. long, the cavity 4 cm. wide, and the wall from 1·2 to 1·5 cm. thick; the cervix was 4 cm. long. A narrow scar, 2·5 cm. long, occupied the fundus and upper part of the anterior wall. The endometrium was pale yellowish-white, soft, and up to 0·3 cm. thick. The *ovaries* were rather large (left: 4·5 × 3·3 cm.; right: 3·7 × 3 cm.) and showed an abundant fibrous stroma containing numerous follicular cysts measuring up to 0·4 cm. diam. A hæmorrhagic corpus luteum (2·3 × 1·3 cm.) with a lutein zone, 0·2 cm. broad, was present in the left ovary.

MICROSCOPIC EXAMINATION

The pituitary gland was treated in the same manner as in Case 1. Portions of the following tissues were embedded in paraffin: liver, both kidneys, spleen, suprarenal body, thymus, thyroid and parathyroid glands, carotid bodies, body of pancreas, both ovaries, upper lobe of left lung, left basal ganglia, right pectoral muscle, body of uterus, trigone of urinary bladder, and marrow from right femur. Portions of rib, great trochanter, and sternum were decalcified in Müller's fluid for three months followed by 0·5 per cent. nitric acid in 4 per cent. saline formaldehyde. The same stains were employed as in Case 1. Sections of the liver, both kidneys, spleen, pancreas, suprarenal body, right pectoral muscle, and left basal ganglia were cut on the freezing microtome and stained with Scharlach R and hæmatoxylin.

The pituitary gland.—Near the centre of the upper half of the anterior lobe is a sharply defined spherical adenoma measuring 1·5 × 1·2 mm. in the horizontal plane and about 2 mm. in the vertical plane (Fig. 4). It is not encapsulated but the surrounding acini are compressed. The cells are well preserved and are typical basophil cells of the same size and shape as those of the surrounding gland. In the margins of the upper and lower poles of the adenoma a few acidophil cells are mingled with the basophil, and the outline of the tumour is here rather poorly defined. The remainder of the anterior lobe presents no obvious abnormality. It is not possible, on inspection, to detect any disturbance in the relative proportions of the three types of cell present. The posterior lobe is intact and is relatively small. There are a few minute areas adjacent to the pars intermedia in which the tissue is occupied

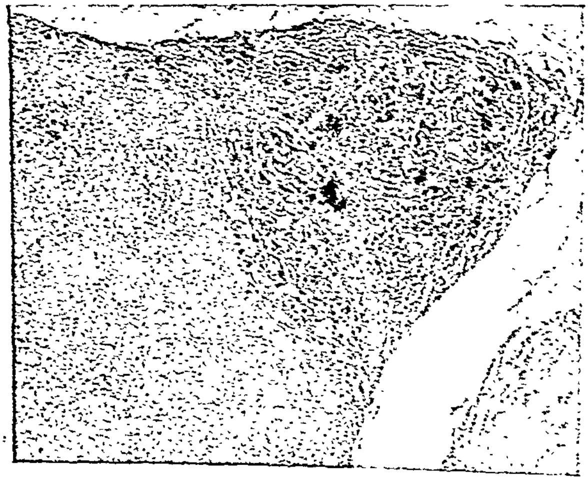

FIG. 3.—Basophil adenoma at antero-lateral border of anterior lobe. Acid-fuchsin aniline-blue (× 13).

by small groups of basophil cells. A somewhat larger group is present near the deep surface of the posterior lobe (Fig. 5); it is not, however, of abnormal dimensions.

The kidneys.—A moderate degree of ischæmic nephritis with none of the inflammatory changes typical of Bright's disease is present. In the lumina of some of the tubules and in the interstitial tissue of the cortex are rather abundant deposits of amorphous hæmatoxyphil material which blackens with the silver nitrate method of von Kossa and is negative to the Prussian blue test. These deposits are probably, therefore, of calcium.

The endocrine glands.—In the *suprarenal body* the normal pattern of cortex and medulla is preserved. The cortex is not hypertrophied. There is much lipoid in the zona fasciculata. One minute cortical adenoma is present in the capsule. In a section stained with acid-fuchsin aniline-blue, after mordanting with potassium bichromate, there is a very scanty amount of fuchsinophil material in the cytoplasm of a few of the cells in the innermost layer of the cortex. There is extensive post-mortem digestion, but no further change in the parenchyma of the *pancreas*. The islets show post-mortem degeneration but no fatty changes. The lobules of the *thyroid gland* contain many large, often very large, vesicles which contain colloid but very rarely show any flattening of their epithelial lining. Among these are numerous small vesicles which contain a little colloid, or are empty, or are filled with epithelial cells. There are a few areas of lymphocytic infiltration. The appearances are those of exceptionally active secretion and storage of colloid. The *thymus* consists of small, but definite, lobules of thymic reticulum with numerous focal areas of lymphoid infiltration, which form an interrupted cortex. There are many small Hassal bodies in the medulla. The *parathyroid glands* and *carotid bodies* appear normal. Both *ovaries* show corpora fibrosa and Graafian follicles in various stages of maturation. The corpus luteum in the left ovary contains red corpuscles and fibrin and has a deep, well-defined border of lutein tissue. A loose net of collagen fibres and fibroblasts occupies a narrow zone in the margin of the clot. The *endometrium* is deep. The tubules are large and slightly tortuous. In the outer three-quarters the stroma is rarefied and its spindle cells are slightly rounded.

The *bones* are normal in histological structure. Hæmopoietic marrow occupies about an equal area with adipose

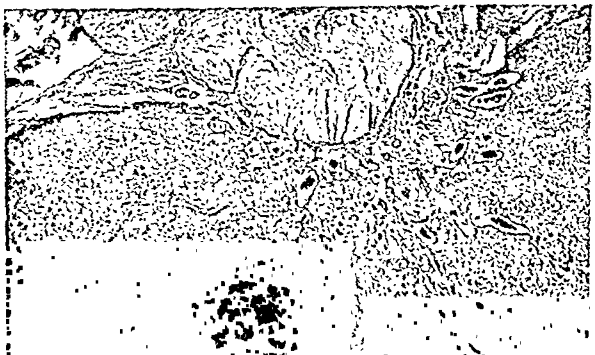

FIG. 4.—Basophil adenoma in anterior lobe. Note compression of surrounding acini. Acid-fuchsin aniline-blue (× 13).

in the centre of the shaft of the femur, but is in moderate excess in the rib and sternum. The hæmopoi
normal in character.

Discussion

Two cases have been described in which
adenoma of the pituitary gland was sus
necropsy on account of the physical appearan

subjects and the presence of a conspicuous degree of cardiovascular hypertrophy.

In the first case a full clinical investigation had caused attention to be centred upon the cardiovascular and renal systems. The possibility of a

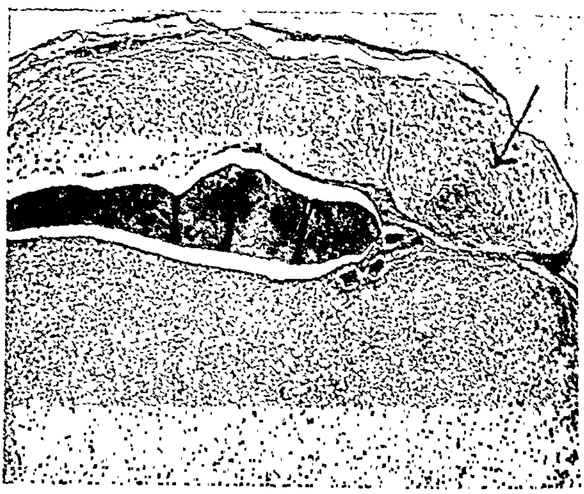

FIG. 5.—Arrow shows largest area of inversion of posterior lobe by basophil cells. Acid-fuchsin aniline-blue (× 13).

pituitary tumour had been considered at an early stage of the illness on account of the severe headache, obesity, and impotence, but was abandoned when the radiological examination proved to be negative. After that the case was regarded as one of essential hypertension. Finally, the finding of albuminuric retinitis suggested the presence of a malignant hypertension (nephritis repens), and this suspicion was later justified by the manner of his death. In retrospect several of the principal clinical features of Cushing's syndrome could be identified in this case: the obesity of peculiar distribution associated with
abdominal striæ, hypertension, plethor admission. The
rhages, and impaired sexual functi age.
was, however, transitory. The skin l d back to school-
terminal and were doubtless due to knamed "Fatty."
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claimed as part of the syndrome een married ten
namely, osteoporosis and skeletal defo ncies. The first
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In the first case cardiovascular hypertrophy and chronic Bright's disease formed the most conspicuous part of the pathological anatomy and were undoubtedly the cause of death. The second was a straightforward case of cerebral hæmorrhage secondary to cardiovascular hypertrophy. For a woman of such short stature the hypertrophy was very great. The renal changes here were of pure ischæmia—that is, they were secondary to the vascular degeneration present in the kidney and there was no trace of the histological characteristics of true Bright's disease.

In the pituitary gland alone of the endocrine organs was there an abnormality common to both cases. In the second case the thyroid gland showed an exceptional degree of activity, the appearances resembling those of the hypertrophy of puberty. In the 12 published cases accepted as examples of basophil adenoma the condition of the thyroid gland was described as "colloid goitre" in 1, "early colloid goitre" in 1, "moderately enlarged" in 1, and "slightly enlarged" in 2. In our second case also, the woman of 33, the thymus was sufficiently developed for the glandular tissue to be visible to the naked eye. No significance can, however, be attached to this, because a similar or greater development is found in a considerable proportion of women who have died between the ages of 25 and 35 from various causes. In the 12 accepted examples of basophilism there is only one record of a thymus which appears to have been of exceptional development. In a woman of 20 the gland weighed 24 g. (Teel, 1931). It is not stated whether it was entirely glandular but the microscopic description suggests that it was. Various proportions of glandular tissue are recognisable with the naked eye in the thymus in nearly half the necropsies upon women of 19 to 21. In a review of 80 deaths from various causes other than Graves's disease during these ages, only 3 glands were described as entirely glandular, and the weights were 8·3, 10·9, and 23 g. The latter gland occurred in a woman of 19 who died from broncho-pneumonia. An "almost completely glandular" thymus weighing 22 g. was found in a woman of 20, killed by an accident. From the available data, therefore, an entirely glandular thymus of 24 g. at the age of 20 would appear to be exceptional and possibly significant.

The rarity of enlargement of the thymus in basophilism is remarkable in view of the very similar clinical syndrome of Leyton, Turnbull, and Bratton (1931) and Kepler (Case 4, 1933). In this syndrome neoplasms of the thymus were associated with plethora, hirsuties, adiposity of similar distribution to that in basophilism, diabetes, hypertrophy of the suprarenal cortex, and hyperactivity of the thyroid gland, while serial microscopic section revealed no abnormality in the pituitary gland.[1] Cardiovascular hypertrophy was found at necropsy in one case and the blood pressure was abnormally high during life in another. The ribs were friable in Kepler's patient.

In both the cases here reported the suprarenal bodies were well within the limits of normal weight (Leyton, Turnbull, and Bratton, 1931). There were no cortical adenomata in the first case and a few pinhead adenomata only in the second. In three also of the verified examples of basophilism reported in the literature (Bauer, 1930, Bishop and Close, 1932, and Kepler, 1933, 1934) the suprarenal bodies were of normal size. It seems legitimate to assume from these five cases that the suprarenal cortex plays a secondary part in the syndrome. In both our second case and in Bauer's case the pituitary adenoma was very small. It might therefore be argued that cortical hypertrophy occurs only when the adenoma has attained a certain size. The adenomata, however, in our first case and in the Bishop-Close case were relatively large and the suprarenal bodies here too were of normal size.

In view of the recent, and apparently paradoxical, claim of Cushing (1932) that the basophil cells are closely linked with the gonadotropic hormone of the pituitary gland and that adenomata of these cells consequently lead to sexual dystrophy, it is noteworthy that in our first case the testicles showed active spermatogenesis in spite of the history of impotence, while in our second case there was no irregularity of menstruation and at necropsy the sexual organs were of full size and of normal histological appearance. Graafian follicles were present in both ovaries and a corpus luteum in one. This second case offers some analogy to Teel's case in which a small adenoma, 2·5 mm. diam., was found on serial section. Menstruation had been irregular, but a corpus luteum was present in one ovary. Both Teel's adenoma and that discovered in our second case were therefore relatively small, and it might be argued that they were too small to produce any gonadal disturbance. But in Bauer's case the adenoma was even smaller (0·9 × 0·5 mm.) and amenorrhœa was included among the typical features of the syndrome. Gonadal disturbance does not appear, therefore, to be correlated with the size of the adenoma.

From a study of the blood picture and tissues in Case 1 erythrocythæmia can certainly be excluded, whilst the tissues in Case 2 show no appreciable degree of erythrocythæmia. In neither of our two cases did the bones present any macroscopic or microscopic evidence of osteitis fibrosa or any other abnormality.

Our two cases, considered in conjunction with those reported elsewhere, suggest that the correlation between basophil adenoma, obesity, and persistent high blood pressure is very close. They show that the correlation, if it exists, is between basophil adenoma and high blood pressure as such, and not between basophil adenoma and chronic Bright's disease. This point is stressed because MacMahon, Close, and Hass (1934) have recently described the changes of malignant nephrosclerosis in two verified examples of basophil adenoma. Through the kindness of Drs. Close and Bishop one of us (D. S. R.) has been able to examine histological preparations of the kidney in the Guy's Hospital example. The similarity between this and the kidney in our first case is very striking. Further work is needed to show whether basophil adenomata can also be demonstrated in types of chronic Bright's disease with secondary cardiovascular hypertrophy other than malignant nephrosclerosis (nephritis repens, type 4), a form of nephritis in which the degree of cardiovascular hypertrophy is often maximal. Both Kraus (1928) and Berblinger (1932) claim that an increase in the number of basophil cells is demonstrable in a large percentage of all cases of hypertension. According to them the increase is diffuse and they do not describe discrete masses of these cells in either the anterior or the posterior lobes. They do not appear to have made any differential counts of the cells in the anterior lobe in support of their claims. The nature of the relation between the basophil cells and the cardiovascular system is as yet unknown.

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[1] Serial sections of the pituitary gland in the two cases of Leyton, Turnbull, and Bratton were made after the original publication. (See Kepler, 1933, p. 103, and Cushing, 1933, p. 519.)

In recent papers Cushing (1933, 1934) suggests that basophilic invasion of the posterior lobe may be potent in producing the features of his syndrome as well as the clinical conditions of eclampsia and essential hypertension. He was led into putting forward this suggestion by finding, in addition to a basophil adenoma, an extensive infiltration of the posterior lobe with basophil cells in a fatal case of his syndrome. In neither of our two cases was the amount of such infiltration as great as is often found in normal subjects. Fig. 5 shows the largest area present—Case 2.

Summary

(1) The clinical and pathological features are described of two cases of basophil adenoma of the pituitary gland. (2) The syndrome described by Cushing as "pituitary basophilism" was imperfectly manifested in both examples, especially in Case 2. (3) The salient feature in both was cardiovascular hypertrophy. Obesity was present in both, but was of atypical distribution in Case 2. In the female there was moderate hypertrichosis of masculine distribution. (4) Bright's disease was the cause of death in Case 1, but in Case 2 cerebral hæmorrhage complicated essential hypertension and primary ischæmic nephritis of moderate degree. (5) In neither of our cases was there any abnormal invasion of the posterior lobe by basophil cells. (6) The association between basophil adenoma and cardiovascular hypertrophy is emphasised, but the nature of the association remains obscure.

Our best thanks are due to Prof. H. M. Turnbull for his help in preparing this paper, and to Drs. W. W. Woods and A. B. Bratton for the necropsy reports.

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Bad Nauheim: Internisten Congress.—Over a hundred people took part in the Internisten Congress held recently in Bad Nauheim, among them being doctors from Spain, Sweden, Bulgaria, and Japan. The visitors were received by Dr. Diehl in the name of the Reichsstatthalter. The director of the Balneological Institute demonstrated some heart sound films, showing that by modern methods it is possible to find out changes of heart sounds much more exact than formerly, the changes being laid down in a curve, so that the improvement or deterioration in the course of a year can be observed. The guests also visited the William Kerckhoff Institute, where the director, Prof. Koch, explained to them the working methods employed for the investigation of cardiac disease. Entertainment at the Johannisberg concluded the visit.

SOME POINTS IN THE TREATMENT OF RHEUMATIC DISEASES*

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PHYSICIAN TO THE DEVONSHIRE ROYAL HOSPITAL FOR RHEUMATIC DISEASES, BUXTON

The infective origin of rheumatic fever and rheumatoid arthritis is now generally admitted, but the precise mode in which the infective agent sets up the disease is believed to be much more complex than was supposed. While some strain of hæmolytic streptococcus probably plays an important part it seems probable that other organisms may be capable of producing a symptom complex clinically indistinguishable from that attributed to the streptococcus, or may be associated with it. Gibson and Thomson[1] after a searching investigation arrived at the following conclusions: "Acute rheumatism is due to some infective agent not yet defined, whose entry into the body may be facilitated by infection with hæmolytic streptococci. A possibility is that the late allergic manifestations of streptococcal infection may damage the tissues susceptible to rheumatic infection and facilitate generalisation of the specific agent." Continuing, they say: "Such a theory correlates (1) the close epidemiological association of the hæmolytic streptococci with acute rheumatism, and (2) the widespread distribution of hæmolytic streptococcal infection and the comparatively limited distribution of acute rheumatism."

These observations apply with equal appropriateness to rheumatoid arthritis which is undoubtedly due to some infective agent not yet precisely identified, whose entry into the joints may be rendered possible by allergic effects set up by a focus of infection elsewhere either by the same microbe or by others. In expressing this view I am not unaware of the work of Cecil, Nicholls, and Stainsby[2] among others who have isolated from the blood by culture a streptococcus, and claim to have set up arthritis by its inoculation into animals.

INFECTION AND HYPERSENSITIVENESS

In a large proportion of cases of rheumatoid arthritis a septic focus can be discovered. From such a focus absorption of toxic bacterial products goes on, and the toxins gradually sensitise the tissues until a point is reached at which rheumatic symptoms develop—whether by reason of the further action of the toxins themselves or by actual bacterial invasion has yet to be demonstrated. It follows that the septic focus should be removed at as early a stage as possible if it can be identified, but never in such a way as to flood the system with toxins; for an acute outbreak of arthritic symptoms has not infrequently been known to follow wholesale extraction of teeth or tonsillectomy. A course of desensitising treatment by means of minute doses of a suitable vaccine may serve to avert such a catastrophe.

In such septic foci usually several different microbes are found, and even though it may some day be proved that certain types of arthritis are invariably associated with the presence of one definite organism, it is probable that the toxins of some prepare the way for others. Swift, Derrick, and Hitchcock,[3] who have done much important work on this subject, state that inoculation with non-hæmolytic streptococci produces a hyperergic condition and increased susceptibility, not only to the same strain but also, to more distantly related strains; possibly, one may add, to entirely different microbes also.

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* Abstract of a lecture given before the Furness Division of the British Medical Association.

The view has long been held on the continent that there is a type of rheumatoid arthritis which is tuberculous in origin but much of the evidence has been unconvincing. Positive reactions to such tests as those of von Pirquet and Mantoux may easily be due to latent tuberculous foci in glands or elsewhere, and the isolation of tubercle bacilli from the blood in cases of acute polyarthritis by the method of Reitter and Lowenstein has generally been unsuccessful in other hands. Recently, however, some cases have been published in which affected joints diagnosed clinically as rheumatoid arthritis have been opened and synovectomy has been performed, histological examination has demonstrated tuberculosis, and culture has in some cases been successful.[4] In two cases of my own of chronic polyarthritis I have found tubercle bacilli in the effusion from the knee-joints. It is stated that in some cases filter-passing types of the bacillus of Koch of low virulence have been isolated, which on inoculation into guinea-pigs have set up a tuberculous adenitis but not a general tuberculosis.

It cannot be denied that the constitutional type, and the symptoms apart from the actual arthritis, in many cases are similar to tuberculosis. There is also the possibility that a chronic tuberculous focus in the glands or elsewhere can sensitise the tissues to and thus favour infection by streptococci, but it seems more probable that the sensitisation of the tissues is set up in the first case by streptococcal infection and infection by tubercle follows.

The sensitisation of the tissues brought about by the absorption of toxins from a focus elsewhere in the body is of great importance, inducing an allergic condition. Rich [5] defines allergy as that state of specific hypersensitivity which develops as a result of the entrance of foreign protein into the tissues—with local tissue damage wherever the foreign protein or a fraction (haptene) lodges in the sensitised tissue, and constitutional symptoms when the protein to which the body is sensitised enters the blood stream. Some writers do not draw a distinction between allergy and anaphylaxis, and the whole problem is difficult and confusing; but while sensitisation is generally believed to be a stage in the development of immunity, Rich has shown that it is possible to separate the two processes. Acquired immunity is an ability to inhibit the growth and invasion of bacteria whose toxins have been the sensitising protein, and to neutralise these toxins. There may be such a degree of immunity as can cope with a small invasion, but an extensive extraction of teeth or a tonsillectomy may release more of the specific toxin or organism than can be dealt with, or sensitiveness may be heightened by injudicious vaccine therapy or otherwise, and fresh invasion takes place from the original focus or from secondary foci.

Hypersusceptibility may of course result from other causes—climatic conditions to which the individual is ill-adapted, by no means the same for everyone; malnutrition from lack of suitable food, under which heading may be included vitamin deficiencies; overwork or severe nervous or emotional strain, such, for example, as often results from long nursing of a sick relative; shock; endocrine deficiency; bad hygienic conditions at home or in the workshop; and many others. All these conditions may be regarded as sensitising factors in the widest sense.

USE OF VACCINES

The specific treatment of the bacterial factor has been the object of much research both at the bedside and in the laboratory. Treatment by vaccines has had a great vogue, and is based on the assumption that by the administration of a suspension of a microbe believed to cause the disease we might raise the resistance of the body and thus enable it to overcome the infection. While overwhelming clinical evidence of the value of this procedure in securing prophylaxis is forthcoming no such claim can be advanced for it as a method of treatment, and as Topley [6] says, "the practice of vaccine therapy rests on a very inadequate basis of experimental evidence." As a method of treatment it has been more extensively used in chronic rheumatic disease than in any others, with the exception perhaps of local staphylococcal lesions where the conditions are different. To the ordinary observer it seems illogical, when the system is already invaded by some microbe, and has presumably mustered all its defensive forces to combat the invasion of the bacteria and to neutralise their toxins, to inject further doses of the same toxins. And yet good results have undoubtedly followed such treatment in some cases, though I fear more cripples than cures have resulted from indiscriminate and injudicious vaccine therapy. To what, then, are the successes to be attributed? It may be that the amount of toxin or bacteria absorbed from the septic focus is insufficient to rouse the whole of the defensive forces of the body, and the vaccine produces a further or more powerful stimulation; but, on the other hand, the risk of sensitising the tissues further is a very grave one, and in consequence dosage must be extremely small to begin with if it is thought desirable to use such treatment. A vaccine administered in very small doses at suitable intervals, or in such a way as to secure very slow absorption as by the intradermal method, appears to act not by stimulating antibody formation but by inducing desensitisation.

An example of this method of desensitisation is found in the prophylaxis and treatment of hay-fever and asthma—typical allergic states—by the injection of minute doses of the protein or other substance to which the victim is susceptible. It does not appear essential for desensitisation that the vaccine should be autogenous, and as proof is yet lacking as to the exact nature of the infecting organism it seems hardly justifiable to speak of an autogenous vaccine if by that it is claimed to be a vaccine of the infecting microbe. All that can be said is that it contains some of the microbes from the patient's own focus, and may therefore be more effective in desensitisation in the particular case.

The intradermal use of vaccines for desensitisation has been tried, particularly in France, with some promising results. The method has three features—slow absorption of minute doses of a mixed antigen; the stimulation of the deeper layers of the dermis to produce antibodies, which some regard as a point of importance; and polyvalency with the inclusion of tuberculin which is regarded as a universal non-specific antigen—and this may be the most important feature. The possibility of a tuberculous basis in some forms of arthritis to which reference has already been made receives support from the good effects which I have known to follow treatment by this method. It is necessary to study the effects carefully, increasing the intervals gradually, especially if there is reason to suspect the existence of tuberculous foci, active or latent, in the system. If there is no sign of benefit after three or four inoculations it is better to try some other method, but I have noted in several cases marked improvement manifested by a rise in the sedimentation-rate as well as in the general symptoms. A course of ten or fifteen inoculations seems to be the best, followed, if necessary, by chrysotherapy.

This method of using vaccines as desensitising agents has the advantage of being reasonably free from risk, but none the less requires care, and it is desirable that a chart of the temperature should be kept and the character of any reaction noted carefully upon it; with such precautions the dose may steadily be increased, but any sign of increasing reaction without a proportionately increased dose calls for a temporary cessation of the treatment or the trial of some other method. In my opinion, the success which is claimed for a vaccine which is supplied commercially, and has attained considerable popularity for the undoubtedly good effects which have resulted in many cases, is due to its action as a desensitising agent.

In regard to the intradermal use of a vaccine, the observation of Auer [7] is of interest; he found that injury to the skin of a sensitised animal when antigen was in the circulation might produce a local reaction due to the actual excretion of sensitinogen into the injured area. Jenkins [8] has suggested that from this observation it may be inferred that once a joint is damaged a more or less continuous irritation is set up by the antigen in the blood, and a vicious circle is started which can only be broken by the removal or neutralisation of the circulating antigen.

The use of vaccines in the ordinary way is believed by some to be simply a form of protein shock therapy. However produced, so-called protein or peptone shock sets up an anaphylactoid reaction differing in some details from true anaphylactic shock; but the resemblance to the shock effect produced by antigen-antibody reaction is striking. This is due to the liberation of a histamine-like substance, and the influence of histamine in the treatment of arthritis is receiving considerable attention. As a local method it has proved of definite value.

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BACILLARY DYSENTERY OF THE NEWCASTLE TYPE

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With a Note on the Bacteriology

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ON Jan. 15th, 1934, Dr. R. J. Ormsby, medical officer of health for Standish, called at my office and asked me if I would admit to the Wigan Infectious Diseases Hospital two cases of probable food-poisoning. He informed me that four people had been affected in one house in his district, a mother and her three children. The two children referred by Dr. Ormsby for admission had partaken of corned beef none of which was left for examination. The mother and the other child had not partaken of it. This third child, a boy, J. S., aged 12, had been sent to the Wigan Infirmary with marked cerebral symptoms *in addition to frequent vomiting*, abdominal pain and diarrhœa. He had a history of having fallen on his head a week before and, as the cerebral symptoms pointed to possible compression, he was trephined. He died on Jan. 15th, and post mortem marked inflammation of the intestinal tract was found. I advised Dr. Ormsby to call at the local infirmary and ask Dr. W. E. Cooke, the pathologist to this institution, if he would kindly forward to Dr. W. M. Scott, of the Ministry of Health, specimens of liver, kidney, spleen, stomach and intestines from the case according to the recommendation of the Ministry of Health in cases of possible food-poisoning. This material was sent as requested.

The other two children were admitted to the Wigan Infectious Diseases Hospital on Jan. 15th, 1934. The boy, F. S., aged 8, was extremely ill on admission with very frequent vomiting, abdominal pain, diarrhœa and symptons of cerebral irritation. His temperature rose to 103° F. on the second day and there was some delirium and violent headache. His colour was poor and his pulse very weak, with sighing respiration. He still complained of severe abdominal pain and there was much abdominal tenderness and rigidity. The vomit was very offensive and the stools, green and very foul smelling, showed occasionally mucus with traces of blood.

The other child, a sister, E. S., aged 11, was not so acutely ill on admission but had had very similar symptoms before that. She complained of severe headache but the vomiting and diarrhœa had subsided; there was some mucus in her stools. She made a rapid recovery.

The treatment was symptomatic together with rectal salines and glucose. Six days after admission the boy, F. S., had completely recovered. Specimens of his vomit and fæces were sent to Dr. Scott and specimens of his blood and that of his sister a fortnight later for agglutinin tests.

There is no evidence that any particular article of food conveyed the disease; no other similar cases are known to have occurred in the neighbourhood One may hazard the guess that the source of infection of this family may have been an undiscovered carrier.

Note on the Bacteriology. (*By* DR. SCOTT.)

The colon of J. S. received on Jan. 18th showed definite congestion with minute hæmorrhages in the mucosa.

MacConkey plates inoculated with scrapings from the mucous surface yielded only one non-lactose-fermenting colony (among many typical *coli* colonies). With the fæces from F. S., however, MacConkey plates were obtained showing numerous non-lactose-fermenting colonies. The two strains thus isolated, J. S. and F. S., behaved exactly alike in culture; they were non-motile, produced no indole and fermented dextrose and dulcitol but not lactose, sucrose or mannitol. The dextrose fermentation was evident after 24 hours but the dulcitol not till after five days at 37° C. With both "sugars" a small bubble of gas was produced as well as acid. Agglutination tests were negative with sera of the salmonella group and of the Flexner and Sonne dysentery types, but were positive to full titre (1600) with serum prepared with a strain of the Newcastle bacillus described by Clayton and Warren,[1] as well as with sera prepared with strains, regarded as serologically identical, isolated (1) by Downie and Wade [2] near Manchester,

(2) by Young[2] in Nigeria, and (3) by Boyd[3] as type 88, in India. The last-mentioned serum (Boyd 88) (titre 3000) was completely robbed of agglutinin for its homologue, as well as for Newcastle, Manchester and Nigeria strains, by absorption with cultures J. S. and F. S. Cross-absorption was not done, but there seems no reason to doubt that these two strains from Wigan belong to the species *Bact. dysenteriæ* (Newcastle). It is of interest that the Wigan strains are the first, so far as published records go, to be found in cultural agreement with the original strains of Clayton and Warren. The strains described by Downie and Wade were mannitol-fermenters, that by Young was originally motile, though it lost this character in subculture, while none of the strains of Boyd's type 88 (all mannitol-fermenters) produced gas with any "sugar."

Major Boyd, R.A.M.C., reports (personal communication) that his type 88 is responsible for quite a large proportion of cases of bacillary dysentery in India, and I have myself found to be serologically identical with it, and with the Newcastle strain, some 12 strains isolated in Waziristan by Capt. G. T. L. Archer, R.A.M.C., and brought to me by him last February. It is evident that the Newcastle bacillus is widespread in distribution and the cause of typical and not seldom fatal dysentery. Its identification in practice is most easily and rapidly achieved by direct macroscopic agglutination of a portion of a colony from the primary plate, inoculated with dysenteric mucus, in a drop of the specific serum, diluted, say, 1 in 50 with saline. The other dysentery bacilli, Shiga, Flexner and Sonne, will emulsify in such a drop without clumping, while bacilli from a colony of the Newcastle species will immediately run into dense clumps visible to the naked eye (but preferably inspected with a hand lens). In other specific agglutinating sera (Shiga, Flexner, Sonne) similarly diluted, the Newcastle colony will give perfect emulsions. Culturally the species is variable, as stated above, but the absence of indole-formation and the (slow) fermentation of dulcitol appear to be constant characters of differential value. Retrospectively, the diagnosis may be made by Widal tests of the convalescent serum with suitable suspensions of the Newcastle bacillus (preferably 24-hour broth cultures killed and preserved for storage by chloroform). The tests should be made in the usual way with serial dilutions of the serum in the water-bath at 50° C. for four hours and titres as high as 640 have been recorded (Downie and Wade[2]). In the case of the patients J. S. and E. S. of the Wigan outbreak above described, the titre for an emulsion of the Wigan strain reached 320 and 160 respectively, the blood having been obtained 14 days after onset of the disease. With the various Flexner types and with the Sonne bacillus, J. S. and E. S. convalescent sera gave practically no agglutination (negative at 1 in 20). The Wigan emulsion tested with "normal" human sera (Wassermann specimens), as controls, gave completely negative results with five out of six specimens: the sixth gave fine clumps up to 1 in 40 dilution, but not higher. Widal tests in Newcastle infections are, therefore, closely comparable in titre level to those in Sonne infections and are equally useful in epidemiological investigations.

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TREATMENT OF BRONCHIAL ASTHMA

BY DORSAL PERI-SYMPATHETIC INJECTION OF ABSOLUTE ALCOHOL

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Technique.—The patient is seated leaning forwards, the hands resting on the knees; the spine is arched backwards, and the tips of the shoulders are drawn in so as to allow the maximum retraction of the scapulæ. A point is selected 4 cm. away fom the spine, preferably in the third, fourth, fifth, or sixth intercostal spaces. A few drops of novocaine are injected intradermally so as to raise a weal; the needle carrying the absolute alcohol is introduced perpendicularly just above the space to be injected down to the inferior margin of the rib; as soon as the rib is felt the needle is directed slightly downwards and 45° forwards and inwards to the depth of about 2 cm. away from the lower margin of the rib. The point of the needle is now between the external and internal intercostal muscles. The needle is pushed slightly further inwards towards the spine and about 2·5 c.cm. of absolute alcohol are slowly injected, slightly altering the position of the needle for each spurt. Usually a sharp pain is felt in two or three interspaces immediately below the site of injection. Two or three intercostal nerves can be dealt with at the same sitting.

The only possible complication is injury to the pleura; the entry of the needle into the pleural cavity can be, however, easily observed by the thick velvety feel of the pleura and by a hissing noise due to entry of air (it is preferable therefore to introduce the needle alone without the syringe). In doubtful cases the needle should be connected with a manometer, and the presence or absence of respiratory excursions of Hg will show whether the needle is, or is not, in the pleural cavity.

Similar results may be directly obtained by dorsal sympathectomy. Leriche in Nelson's "Loose Leaf Living Surgery" (Vol. IV.) describes the following method of the latter:—

> A vertical incision is made one inch lateral to the spine and two inches above and below the selected intercostal space; the muscles are split and retracted as far as the articular processes inwardly and the costal tubercles outwardly. The transverse process is divided close to its base, and the intercostal nerve is exposed lying on the endothoracic fascia covering the pleura—below the corresponding vein and artery. The nerve is hooked forwards, and the rami are recognised as tense threads on the inferior aspect of the nerve; they are sectioned, and the wound closed.

Leriche reports a number of successes by this method.

Adson advocates very much the same line of approach to the second intercostal space. His further steps comprise resection of the second rib, division of the sympathetc trunk below the second thoracic ganglion, followed by total extirpation of the lowest cervical and the first and second thoracic ganglia. In this way all the fibres travelling to the pulmonary plexus via the cervical sympathetic are completely divided. The operation appears rather severe, and too widespread in its effects; all the other thoracic organs—the heart and the œsophagus—are largely deprived of their sympathetic supply; branches to the brachial plexus are also completely interrupted.

It is obvious, however, that injection of absolute alcohol into the bronchial sympathetic nerves is in many respects more advantageous than an operation. Injection can be repeated many times without undue disturbance to the patient; total destruction of sympathetic rami is unnecessary, partial destruction being sufficient to alter the nerve balance in favour of relaxation; and, finally, advanced asthmatics are hardly fit subjects for operative interference.

Clinical Observations.—So far, 16 patients have been treated by the absolute alcohol method, the majority of them being so-called incurables. In 10 cases there was complete relief after four to eight injections; in one case there was sufficient improvement after two injections for the patient to discontinue treatment; in 3 cases there was a very considerable improvement after two or three injections; in 2 cases the improvement was only slight. The following are brief case-histories:—

CASE 1.—Mr. A., aged 30. Severe asthma of four years' standing. No relief from adrenaline. No improvement after a course of autogenous vaccine prepared from sputum. Signs of heart failure. Life unbearable. Injection of absolute alcohol in the third and fourth rami on each side. Great improvement after the second injection. Complete disappearance of asthma after the fourth injection. No return of asthma for the last three years.

CASE 2.—Miss B., aged 22. Bronchial asthma since age of 6; totally incapacitated for pleasure or study. Only temporary relief after injection of morphia gr. ¼. Heavy nasal catarrh. Improvement after autogenous vaccine and peptone—return of asthmatic attacks with vengeance. Four absolute alcohol injections into the fourth and sixth left interspaces and the fifth and sixth right interspaces. Pleuritic pain after the first two injections necessitating rest in bed. Complete cure; no recurrence for the last two years.

CASE 3.—Mr. C., manual worker, aged 48. Since age of 12 subject to bronchial asthma; never entirely free; incapacitated for work four months in the year. Treated by alcohol injections, five in all. Breathing has been perfectly free for the last 20 months.

CASE 4.—Mr. D., aged 31. Severe daily attacks of bronchial asthma for the last six years; unable to sleep for a period longer than two hours at most. Four absolute alcohol injections into the third and eighth left interspaces, and the fifth and sixth right interspaces. Considerable improvement; the attacks now occur only in a mild form and, on the average, once in ten days.

Summary.—(1) The bronchial rami contained in the sympathetic dorsal fibres are comparatively superficial at one part of their long course—namely, at the point where they join the corresponding intercostal nerves. At this point they are open to attack either by knife or by absolute alcohol injection. (2) Clinical results of alcohol treatment are so far very encouraging, cure resulting in three-quarters of the cases. (3) The cases most suitable are those of long-standing inveterate asthma.

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SECONDARY CARCINOMA OF THE MYOCARDIUM

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CARCINOMA with secondary involvement of the myocardium is occasionally found post mortem, but is rarely recognised during life; indeed Goldstein,[1] who reviews 100 cases of primary tumour of the heart and reports nine cases of secondary growth, says that the diagnosis is never made until autopsy. Hamilton,[2] who found secondary involvement of the heart in 0·28 per cent. of cases of carcinoma, states that the primary lesion is most often in the thorax. Welch[3] reports a case in which it was in the prostate. He gives figures from the pathological institute of the University of Berlin showing that in 6655 autopsies there were 15 cases of carcinoma of the heart (0·22 per cent.). The lesion was always secondary, and the primary was in various organs. Boyd,[4] who also mentions the extreme rarity of myocardial secondaries, says that malignant melanomata are the most common growths to give rise to deposits of this kind.

In 1281 autopsies at the Leicester Royal Infirmary there were 103 cases of carcinoma, 32 of sarcoma, and 9 other malignant growths. Among these there were four cases in which there was growth in the myocardium, two of carcinoma (1·9 per cent.), and two of sarcoma (6·2 per cent.). Including all autopsies, carcinoma of the myocardium was found in 0·3 per cent. A primary sarcoma of the mediastinum gave rise to a mass in the pericardium which ulcerated into the left ventricle; a small round-cell sarcoma of the retroperitoneal tissues was associated with nodules in the heart muscle; a primary carcinoma of the left suprarenal was followed by pericarditis due to deposits in the pericardium. The fourth case is now reported.

Specimen showing secondary deposits of carcinoma in the myocardium, the primary growth being at the pylorus.

History—A. B., aged 42, a grocer's assistant, was admitted to hospital on Oct. 12th, 1931, complaining of a pain in the back. He had first complained six months before, but no abnormal physical signs were elicited and a provisional diagnosis of sciatica was made. A course of radiant heat baths was advised and the patient experienced relief for a short time. When the pain recurred it was referred to the middle of the back. It was gnawing in character, present all the time, but worse at night so that sleep was disturbed. Although the pain was not related to food, the appetite was poor. There was neither nausea nor vomiting. The bowels had been loose but on admission to hospital were normal. There had been no melæna;

much weight had been lost. Two months before admission to hospital numerous small tumours had appeared in the skin of the abdomen and thorax.

Examination.—The patient looked much older than his years, and was very emaciated. The tongue was dry and swollen, the gums edentulous. No abnormal physical signs were found in the lungs. The apex-beat was not displaced, the heart sounds were regular and of good quality, and there were no cardiac murmurs. The skin of the abdomen was studded with small tumours each of approximately half an inch diameter. These were freely movable in the skin and were hard. A tumour was visible in the left hypochondrium, appearing from beneath the costal margin, and passing towards and beyond the umbilicus. It moved on respiration. It was hard and tender, the edges were ill-defined, and no notch could be felt in the anterior border. The tumour could not be palpated in the loin and the percussion note over it was resonant. The liver was enlarged two fingers-breadth below the costal margin and its surface was roughened.

Pathological investigations.—The blood count on admission was: red blood-cells, 3,668,000 per c.mm.; hæmoglobin, 50 per cent.; colour-index, 0·68. The red cells showed anisocytosis, poikilocytosis, and polychromasia. No normoblasts were seen. White cells numbered 22,812 per c.mm. (polymorphonuclears, 94 per cent.). A fractional test-meal showed no free HCl throughout; a trace of lactic acid was present. Radiography of the alimentary tract after an opaque meal revealed considerable deformity of the pyloric end of the stomach, suggesting pressure from without the stomach rather than intrinsic disease of its wall, secondary involvement of the latter not being excluded. The gastric emptying time was not impaired, and there was no obstruction in the duodenum. A lesion of the pancreas was suggested. A tumour was excised from the abdominal wall and sectioned; it showed a typical spheroidal-cell carcinoma.

Subsequent progress.—Five days after admission the patient vomited large quantities of dark fluid resembling changed blood. The pulse-rate rose from 100 to 120, the cardiac rhythm remained regular. Death took place on Oct. 25th. Permission to examine the abdomen only was obtained.

Post-mortem report.—The peritoneum was studded with small nodules similar to those in the skin. A small amount of free pus was found round the pylorus. The liver weighed 74 oz., there was extensive perihepatitis, and secondary nodules were present throughout. A large ulcer was found at the entrance of the pylorus with hard, raised edges. This ulcer was adherent to the pancreas which was infiltrated with growth. The mass made by the pancreas and the enlarged posterior abdominal glands comprised the tumour which could be palpated per abdomen. Nodules of growth were found in both kidneys and suprarenal glands. The heart was removed through the diaphragm. The myocardium was studded with small nodules of growth, nodules projected into both auricles (see Figure). Sections of all secondary deposits and the pyloric ulcer were examined, and all showed a similar type of growth. It was a spheroidal-cell carcinoma.

Post-mortem diagnosis: General carcinomatosis secondary to carcinoma of the pylorus.

It will be noticed that there were no symptoms of cardiac damage (save a moderate degree of tachycardia after hæmatemesis) noticed during life. This appears to be usual. The case presented some difficulty in diagnosis, especially as the tumour palpable in the left hypochondrium somewhat resembled an enlarged spleen.

My thanks are due to Dr. J. V. C. Braithwaite for permission to publish this case, and to Dr. W. W. Mackarell for allowing me access to the post-mortem register at the infirmary.

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ANTIHÆMOLYSIN TITRES IN CHRONIC RHEUMATIC AND ALLIED DISEASES

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In 1932 Todd[1] showed that after infection with hæmolytic streptococci the antihæmolysin titre of the serum materially increases and that this increment is found, almost without exception, after an attack of acute rheumatism.

In 1932, following the examination by Dr. Todd of ten samples of serum obtained in this hospital from cases of subacute rheumatism, which gave a high proportion of high antihæmolysin titres, it was decided to investigate a larger series of cases of the various forms of rheumatic diseases admitted to the Devonshire Royal Hospital.

The *methods* used were essentially those given by Todd[2] and Todd and Hewitt,[3] except that the medium used for the preparation of the streptococcal hæmolysin was prepared with bullock flesh instead of horse flesh and the organisms were grown at a very reduced pressure, usually about 30 mm. Hg.

When the cultures were grown at atmospheric pressure it was found that the hæmolytic activity of the filtrate varied considerably. After cultivation at reduced pressure and allowing a longer period of contact during the reduction by the hydrosulphite, a hæmolysin of fairly constant strength was obtained. Half a cubic centimetre of a 5 per cent. suspension of human red blood-cells was completely hæmolysed by 0·05–0·1 c.cm. of the hæmolysin preparation. The hæmolytic broth was stored in vacuo in an ice box.

In the final determination of the antihæmolysin titre of the serum, the minimum hæmolytic dose (M.H.D.) of the hæmolysin was checked against a standard antihæmolysin kindly supplied by Dr. Todd and the results were expressed as antihæmolytic units, one unit being capable of completely neutralising 2½ M.H.D. of hæmolysin.

The results of the examination of 224 cases of rheumatic and allied diseases are shown in the accompanying Table, in which the results are expressed as percentages showing antihæmolytic titres above the normal, the maximum for which is taken as 50 units. This is the highest value obtained in a series of apparently healthy persons giving no history of recent streptococcal infection or sore-throat and agrees with one exception, with the normal values obtained by Todd.[1] [4]

Antihæmolysin Titres

Disease.	Cases.	Percentage. Abnormal (i.e., titre> 50 units).
A. Subacute rheumatism	64	83
B. Infective arthritis	95	59
C. Spondylitis ankylopoietica	11	64
D Spondylitis osteo-arthritica	6	27
E. Osteo-arthritis	6	Nil.
F. Fibrositis	27	52
G. Sciatica	12	(1) 42 (2) 22
H. Paget's disease	3	Nil.
I. Rheumatic fever (after Todd): quiescent	25	24
active	23	100

The values for sciatica are placed under two separate headings: the first, 42 per cent., includes three patients who were subject to frequent sore-throats; the second, 22 per cent., excludes these three patients.

The percentage of cases of subacute rheumatism giving a high titre approximates to that found by Todd in the active acute type and tends to confirm the close relationship that has been assumed to exist between these two types of rheumatic diseases. It will also be seen that the other forms of rheumatic and allied diseases can be divided into two groups.

(1) Rheumatoid arthritis and spondylitis ankylopoietica, having a definitely high percentage of abnormally high values, and which are regarded by many authorities as infective in origin.

(2) Osteo-arthritis and spondylitis osteo-arthritica, non-infective in origin, and giving but few high antihæmolysin titres.

The relatively high proportion of abnormal values in the fibrositis group is very suggestive of an infective factor in some cases, a conclusion also reached by Race [4] from a consideration of the suspension stability results. In the sciatica group, after the exclusion of cases with a history of recurrent sore-throat, the abnormal titres are few, and it is possible that some of these may be due to the presence of an infective fibrositis producing trunk sciatic symptoms. In the three cases of osteitis deformans (Paget's disease) all the results were normal.

Whilst the results given above cannot be regarded as proof of a cause-and-effect relationship between hæmolytic streptococci and rheumatic disease they do suggest that a hæmolytic streptococcal infection cannot be ignored. Other methods of investigation, such as skin reactions and agglutination tests, have also yielded results suggestive of an association of hæmolytic streptococci and rheumatic disease, but their significance when analysed by statistical methods is comparatively low compared with the antihæmolysin titres.

It might be objected that the antihæmolysin titres as determined by the process employed may be vitiated to some extent by the presence of a hæmolytic infection of non-streptococcal origin. Todd [1] examined numerous antitoxic and antibacterial sera, one of which was prepared from *Bacillus welchii*, an organism producing a strong exohæmolysin, and found all to have antihæmolysin titres not exceeding 50 units. Several hæmolytic strains of organisms have been examined in the Devonshire Hospital, and it was found that although streptococcal antihæmolysin serum could neutralise the hæmolysin produced by certain strains of staphylococci, *Streptococcus viridans*, or pneumococci, the hæmolytic property of such organisms is neutralised by such a small amount of streptococcal antihæmolysin as to suggest that any errors that may be produced by such infections are negligible in extent. Cowan [5] was able to produce pneumococcal antihæmolysin in rabbits, but the titre of the serum at its maximum was only approximately 800 M.H.D. as compared with 50,000 M.H.D. in Todd's streptococcal antihæmolytic serum, a ratio of only 1·6 : 100. *B. welchii* and certain strains of *B. coli* produce a potent exohæmolysin, but this is not neutralised by the streptococcal antihæmolytic serum and consequently does not affect the results.

Streptococcal antihæmolysin is not specific in its action, but the other hæmolytic organisms that might affect its determination are so weak in their hæmolysin production that in practice they can safely be ignored.

I wish to express my indebtedness to Mr. J. Race, F.I.C., biochemist to the Devonshire Royal Hospital, for his valuable help, criticism, and useful suggestions, which has made possible the surmounting of many difficulties in the investigations; also I thank Dr. C. W. Buckley, chairman of the research committee, for his interest and encouragement, and Miss M. Harrison, my assistant, for her technical help.

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AN EXPLOSIVE ERUCTATION

By Terence East, D.M. Oxon., F.R.C.P. Lond.,
PHYSICIAN TO KING'S COLLEGE HOSPITAL AND TO THE WOOLWICH MEMORIAL HOSPITAL

> "Behold the stomach: crammed from every dish,
> The tomb of boiled and roast and flesh and fish.
> Where bile and wind, and phlegm and acid jar,
> And all the man is one intestine War!"

No doubt Pope meant these lines to refer to the effects of gluttony. But quite apart from this, organic disease of the pylorus may bring about a similar state of affairs and occasion the following remarkable and unusual mishap.

The patient was a middle-aged man, rather thin and pale. He said that for a number of years he had suffered at times from pain in the region of the stomach after food. Recently vomiting had troubled him. This took place at irregular intervals, the amount being copious. On going into details he remembered bringing up material that he had eaten many hours before. The vomit was offensive as a rule. He also was prone to violent and foul-smelling eructations. But what really distressed him more than anything else was the following startling occurrence.

One evening he had taken his wife to the cinema. There, in the darkness, feeling inclined to smoke, he had taken out a cigarette, and put it between his lips; he struck a match, bringing it up in his cupped fingers. Just at that moment a violent eructation occurred. To his alarm and astonishment, and of those seated near him, there was a flash and a sharp explosion; the cigarette was blown from his lips away across several rows of seats; his moustache was singed, and his lips and fingers burnt. In pain and confusion he had hurriedly to leave the cinema. The astonishment of the neighbours at this "fiery exhalation" can well be imagined.

The diagnosis of pyloric obstruction was fairly clear. Gastric peristalsis was easily seen. The barium meal showed the usual prolonged delay in the stomach. The gastric contents were copious, with yeast cells, sarcinæ, and lactic acid. No doubt the gas from the stomach mingled with the air in the mouth and cupped hands in just the right proportions, the cavities forming an explosion chamber, which required only a naked flame to produce this unpleasant occurrence. At laparotomy a cicatrised ulcer was found at the pylorus.

A few cases similar to this are on record. Beatson [1] mentioned a man whose breath caught fire one night when he was blowing out a match which he had struck to see the time. For some time past the foul odour of his breath had been noted. McNaught [2] described how a man eructated when blowing out a match, which he had struck in the night in order to look at his watch. His breath caught fire and his moustache was burned. In this case the gas from the stomach was analysed, and found to contain CO_2, 56 per cent.; H, 28 per cent.; CH_4, 6·8 per cent.; air, 9·2 per cent. He quoted several cases in the German literature where analysis of the stomach gases showed much the same composition. Another case recorded by Martin [3] suffered from foul eructations, smelling like rotten eggs. When lighting his pipe two hours after breakfast he belched, and there was a sharp explosion, which singed his beard and eyebrows.

No doubt these were all cases of pyloric stenosis. McNaught's patient improved with gastric lavage. The inflammable gases appear to be CH_4, hydrogen, and H_2S.

A gastroenterostomy was done successfully on the patient here described. There was the usual rapid increase in weight and return of well-being, now that his stomach, where, to quote the words of Jenner, "Sits enthroned the grand monarch of the constitution," was once more at peace.

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REVIEWS AND NOTICES OF BOOKS

The Social Survey of Merseyside

Edited by D. CARADOG JONES, M.A. (University Press of Liverpool). London: Hodder and Stoughton, Ltd. 1934. Vol. I., pp. 328, 15s.; Vol. II., pp. 413, 21s.; Vol. III., pp. 560, 25s. Set of three volumes, 45s.

THIS survey, made mainly between the summers of 1929 and 1932 by the school of social sciences and administration of the University of Liverpool, under the direction of Mr. Caradog Jones, contains a mass of varied information on the social and industrial life of the Merseyside industrial area, based on official figures, the knowledge of experts, and a very extensive use of sample investigations and questionnaires.

Vol. I., after giving a history and general description of the area, deals with the income and expenditure of the working classes, the influence of poverty, and housing conditions. Extensive use is made of a household sample of 6906 families containing 28,845 persons; made by visiting 1 in every 30 of the working-class houses throughout the area. The sample showed 26 per cent. of families living more than one family per house, and 17 per cent. of all persons and 24 per cent. of children living under overcrowded conditions. Among the families investigated 16 per cent. of all persons and 23 per cent. of children were found to be living in poverty. (Both overcrowding and poverty were assessed according to definite standards.) A comparison with the results of a sample given in the "New Survey of London and Labour" shows that in London in 1929–30 the percentage of overcrowding was higher but the percentage of poverty lower—owing to the much lower unemployment percentage in London.

Vol. II. deals with the industries and occupations of Merseyside and the trend of employment and unemployment. It incorporates the material provided in 1932 by the University of Liverpool for the Board of Trade. Merseyside is at present a "depressed area" and the major part of its economic activity, that concerned with shipping and distribution, "is chiefly governed by conditions so far reaching in character that only forces set in motion on an international scale can radically improve them." There is a very interesting discussion of the probable effects of tariffs on the different industries, with a plea that similar information should be collected for other areas.

Vol. III. deals in part with local government in general and the functions of public health, public assistance, elementary and secondary education. The Merseyside industrial area is a striking example of the lack of correspondence between boundaries and the social and economic units of population. Its 1,300,000 of population, closely united socially and industrially, is divided between the four county boroughs of Liverpool, Bootle, Birkenhead, and Wallasey, six urban and two rural districts, and the administrative counties of Lancaster and Cheshire. A similar position was revealed in the survey of Tyneside made a few years ago, where the population of the area surveyed came under the control of 15 local authorities. The remainder of this volume is mainly taken up with an investigation into various subnormal types of population, a consideration of the social services and differential fertility, and a record of sample inquiries about the occupations and interests of adolescents, the uses of leisure, infant welfare, and church attendance.

The use of the method of sampling in unusual types of inquiries makes this volume of particular interest. In an inquiry on infant welfare two samples were taken: one consisted of all the births notified in Liverpool during a fortnight in February, 1930—717 in all; the other of 200 births in families too well-to-do to be supervised by the health visitors. As far as possible a record was kept of every baby over a period of two years. In Liverpool, as a whole, more females than males survived and made good progress, but this was true only of the inner districts, containing most of the poor parts of the city. Of the babies in the good types of artisan families 80 per cent. made good progress and only 5 per cent. died, as compared with 45 per cent. and 19 per cent. respectively in the poorest types of families. The child without brothers or sisters had the best record. Premature babies showed a large proportion of deaths (about 40 per cent.) and the survivors made less satisfactory progress than the average. The proportion of breast feeding was higher in the poorer families than in those better off, and in both cases the best results were with the breast-fed babies. In the small number of cases where the mother went out to work the child's progress did not seem to be seriously affected. On the other hand, of the babies in families living in overcrowded conditions, 20 per cent. died and only 38 per cent. made good progress.

The inquiry on church attendance deals mainly with the types of attenders at places of worship. Liverpool is not typical of the whole country in that about 30 per cent. of the population are Roman Catholics. On the basis of censuses made in the past by the *Liverpool Post*, the survey estimates 15–20 per cent. of the population as church attenders. A census of attendance of those aged over 14 taken in two Tyneside towns in 1928 gave a rather similar figure of about 20 per cent. in Wallsend and about 12 per cent. in South Shields. In Liverpool samples were taken of congregations in May, 1930, and 1931, questionnaires being distributed to those attending. The 9087 replies from persons over 14 showed a considerable predominance of women and girls over men and boys in all the three groups considered—Church of England, Roman Catholic, and Free Churches—the predominance being greatest in the Church of England. (The figures for the two Tyneside towns gave similar results for sex distribution.) In respect of sex, age, marital state, and occupation the Roman Catholic congregations resembled the general population more than did the congregations of the other two groups. In these latter there was a larger proportion of the young (aged 14–29) and the old as compared with the middle aged, of single as compared with married women, and of non-manual as compared with manual workers.

Anyone who even dips into this survey must be impressed with the enormous amount of work which has been devoted to its making by many individuals. The results will no doubt be of most interest to those who know the area surveyed, but the authors have been remarkably successful in their appeal to a far wider circle. In many directions the survey adds to our knowledge of the subjects covered.

Japanese Medicine

By Y. Fujikawa, M.D. Translated from the German by John Ruhrah, M.D. New York: Paul Hoeber. London: H. K. Lewis and Co., Ltd. 1934. Pp. 114. 7s. 6d.

We recently reviewed a pendant to this little book dealing with Chinese medicine, but the similarity between the two is only on the surface. The literary history of medicine in China begins 3000 years earlier than the mythical period in the case of Japan, which barely predates Christian era. As, however, there is evidence of intercourse between the Chinese and Japanese more than 1000 years before that era, it is probable that some sort of medical inter-relations had been established before Japan can be said to have had a medical science of her own. Certainly when Buddhism arrived by way of Korea the writings brought by the Buddhist priests were written in Chinese, and everyone who desired to study the new teachings had to learn Chinese. Dr. Fujikawa enumerates eight Chinese medical text-books which were necessary from the beginning to the Japanese medical student.

As we approach the definite historic era of A.D. 1100 we find that the Japanese had themselves produced a considerable number of medical works, though here again the oldest existing medical book of Japan is stated to be partly based on medical treatises introduced from China, abstracts from the Chinese classics forming the text for Japanese editorial observation. The anatomy and physiology of this period, termed by the author the Heian period, and including the 400 years between 784 B.C. and A.D. 1186, are purely fantastic, and their Chinese origin can be readily detected. The basic assumption of the physiological teaching was the existence of the double principle, positive or masculine and negative or feminine; these are the creators of the living body and circulate with the blood and pneuma or air, but no explanation as to how that circulation was maintained was attempted. In general pathology the principal cause of disease was the behaviour of the pneuma, or "live air," drawn through the skin into the body, and according as it proved too hot or too cold for inhalation it worked as an activating power. The influence of the pneuma could cause any single kind of disease to be indefinitely subdivided, a fact which accounts for detailed attention to pharmacy. Medicines were prepared as pills, powders, extracts, tinctures, decoctions, vapours and suppositories, and one pharmacopœia included 81 drugs derived from minerals, 509 from plants, and 182 from animals. In surgery, the Japanese during the earlier periods were more advanced than in medicine; the treatment of wounds, ulcers, and abscesses was often logical, and there was considerable knowledge of ophthalmology. And at the same time sensible attention was paid to hygiene, clothing, housing, ventilation, and foodstuffs.

The development of medical science in the country throughout dates corresponding to the early middle ages in Europe is set out briefly, and the references to literature show that more sources of information exist than might have been suspected. The political conditions of Japan were often stormy when the influence of China would again become paramount, for Japanese savants repaired to the more peaceful neighbouring country to study their science. But real advances came slowly, for during the long Yedo period (A.D. 1616–1876) the pathology of Japanese doctors remained wholly fanciful, resting on theories which are impossible to follow in spite of Dr. Fujikawa's careful analysis of them. The Japanese, however, had detected the romantic nature of much of their anatomy and physiology, and when increasing communications with Europe placed at the disposal of students at the end of the eighteenth century accurate descriptions of the internal organs there were many observers able to take advantage of Western learning.

The recent history of medicine in Japan is supplied by Dr. Kageyas Amano, who enumerates briefly the fine contributions to modern science which followed in the nineteenth century upon the introduction of Western learning. Takamine, Kitasato, Shiga, Noguchi, and Yamagiwa furnished in remarkable succession their additions to the world's wisdom, and the contrast of the last quarter of this little volume with the preceding three-quarters is sheerly dramatic. We have here an almost incredible picture of development.

The 1933 Year Book of Pediatrics

Edited by Isaac A. Abt, D.Sc., M.D., Professor of Pediatrics, Northwestern University Medical School. With the collaboration of Arthur F. Abt, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School. Chicago: Year Book Publishers Inc.; London: H. K. Lewis and Co., Ltd. 1934. Pp. 548. 10s. 6d.

The editors of this volume in what is now a well-known series have again carried out the laborious and extremely useful task of abstracting the year's pædiatric literature. If the attention given to the publications that have appeared in American and English periodicals seems at first sight disproportionately great, it will be found that the essentials of a great number of papers in German, French, Italian, Spanish, and Dutch have been supplied as well. In this volume the section devoted to tuberculosis is one of the most complete; it is interesting to see how the English and American conception of pulmonary infection in childhood is coming into line with the continental view, and how the much-debated "epituberculosis" is gradually being accorded a local habitation, though not on quite the same ground as was originally claimed for it. Amongst recently described diseases that have received increasing recognition during the past year is von Gierke's glycogenic disease, of which no less than seven cases have been reported. The editor appropriately quotes in his introduction the foreword provided by Prof. Adelbert Czerny to the new recruit to the ranks of pædiatric journals, the *Indian Journal of Pediatrics*, the first number of which was published in Calcutta in October, 1933.

The time is long past when any practising clinician can hope to read at all thoroughly the original papers in the world literature dealing even with his own specialty, but this series of Year Books will at least enable him to take note of the more important, and this volume is a good sample of their worth.

THE LANCET

LONDON: SATURDAY, AUGUST 4, 1934

THE PATIENT'S CONFIDENCE

Two months ago we expressed sympathy with the American surgeon who had been fined and imprisoned for not disclosing to the police the fact that he had treated the injuries of JOHN DILLINGER, the gunman. Our enthusiasm for a principle proved somewhat provocative. A lay contemporary was ready to ascribe the surgeon's conduct to "blue funk" rather than to an honourable observance of the oath of Hippocrates. This comment was neutralised by another from a correspondent in the State of Minnesota. Writing of matters known in England mainly through dramatic fiction or travellers' tales, he warned us that gangsters have their underworld doctors and lawyers in every large city in America. Our heroics, in fact, were misplaced; we ought to judge the surgeon by his patients; the professional advisers of the gunman are not so much terrorised as profitably involved in a nation-wide conspiracy of large-scale murder. Among other commentators the *Listener* remarked that it is a dangerous doctrine that makes the surgery a sanctuary for the criminal and "places a man's loyalty to his profession above his loyalty to the State." This antithesis is stated in a form we cannot accept. The surgeon's obligation of secrecy is not founded on loyalty to his profession but on loyalty to the public—that is to say, loyalty to those members of the public who engage his services. The *Listener* was reminded of the conflict of loyalties devised with characteristic skill by GALSWORTHY in his play "Escape." The playwright, by committing a chivalrous gentleman to Dartmoor prison for an unfortunate accident in the first scene, was perhaps unfairly careful to secure the sympathy of the audience for the criminal from the outset. John Dillinger was probably a less lovable figure than Nicholas Hannen in the play. In fact, as the *Listener* concludes, circumstances alter cases. The conclusion is irresistible. The surgeon's duty of secrecy is based on public interest, but admittedly there may be awkward conflicts, and in other matters besides crime, when fresh aspects of public policy appear. Lord RIDDELL, who has written an illuminating essay on this subject, propounded the case of the engine-driver who thinks he is suffering from nervous exhaustion. The doctor, diagnosing G.P.I., tells the patient he is not fit to drive his train; the patient disagrees. Passengers' lives being thus in peril, is the doctor justified in reporting the facts to the railway company? The usual professional solution is to say that the doctor must prevail upon the patient to disclose the facts himself. If the patient obstinately refuses, how is the deadlock to be ended? Some analogy may be discovered in the statutory duty to notify infectious diseases; statutory examination of engine-drivers might create a similar duty of disclosure. Meanwhile the instance suffices to indicate the admitted conflict. There are, as Lord Justice BANKES observed in another connexion (in Weld-Blundell *v.* Stephens), "cases where public policy is better served by respecting the confidence than by abusing it." Nobody doubts that there are also cases where a strong argument can be advanced for disclosure.

The incident of Dillinger and his surgeon leads to a special consideration of professional confidence in relation to criminal cases. Here we shall naturally find that the medical tradition of non-disclosure is unacceptable to judges, directors of public prosecutions and police. This difference of outlook has been particularly marked in the demands made upon doctors to report cases where criminal abortion is suspected—demands which the medical profession has not always felt able to concede.[1] It is worth while to clear the ground by making certain distinctions. In the first place we can distinguish the duty to answer questions in the witness-box under direction of a judge from the disputed duty to report to the police what a patient may have said in the surgery. The doctor's duty as a witness may involve breach of his patient's confidence; the judge may insist on an answer and the witness must then decide how far he can carry his protest. Here the position remains as defined by the great Lord MANSFIELD in 1776 at the trial of the so-called Duchess of Kingston for bigamy. CÆSAR HAWKINS, the celebrated surgeon, was called as a witness and deprecated answering on matters within the rule of professional secrecy. MANSFIELD delivered the decision of the court that he must answer. "If a surgeon was voluntarily to reveal these secrets, to be sure he would be guilty of a breach of honour and of great indiscretion; but to give that information in a court of justice, which by the law of the land he is bound to do, will never be imputed to him as any indiscretion whatever." If we may first distinguish the doctor's duty as an actual witness in court from the demand that he should telephone to Scotland Yard any suspicions he may entertain about his patients, there is a second distinction to be made. It is one thing to give professional assistance in a deliberate plan to commit a crime—for instance, for a doctor to help a wife to poison her husband; that would be a criminal conspiracy. It is another thing to give medical treatment to a man who may be a criminal. The law is naturally prepared to punish those who aid and abet a felony and those who harbour the felon; but physician and surgeon are in a sense non-combatants. "It seems," wrote HALE, the famous 17th-century jurist, "even by the common law, if a physician or chirurgeon minister help to an offender sick or wounded, though he do know him to be an offender, even in treason this makes him not a traitor; for it is done upon the account of common humanity, not *intuitu criminis vel criminosi*; but it will be misprision of treason if he know it and do not discover him." The mysteries of misprision of treason we can leave aside until some registered medical practitioner is accused of the offence. In view of Hale's reminder that much may depend on the doctor's knowledge of crime or criminal, we may emphasise that suspicion is not knowledge nor is it the doctor's business to play the amateur detective. If the victim of a traffic casualty is brought to the surgery, must the patient be cross-examined as to the possibility of his having been criminally negligent? If so, it will be only fair to warn him that anything he may say in the surgeon's presence will be taken down and used in evidence against him.

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[1] See, for example, THE LANCET, 1932, ii., 847, 862, 915.

The spectacular eminence of the Dillinger episode spoils the perspective. To see the principle of professional secrecy in proper proportion we must look at legal as well as medical practice. The confidences which pass between client and solicitor are absolutely privileged from disclosure. The ground of this rule, it has been authoritatively said, is not any special importance of the legal profession but the expedience of securing to every man the full protection of the laws; "a man would be practically precluded from obtaining the aid of skilled advisers if his communications with them were not thus protected from publicity." The rule is far-reaching. An attorney was once subpœnaed to give evidence and to produce certain papers before a grand jury upon an indictment for forgery preferred against one of his clients by whom the papers had been confidentially communicated to him. The court held that he was not compellable to produce the papers against his client, Lord Mansfield ruling that, instead of so producing the papers, the attorney ought, on receiving the subpœna, forthwith to have handed them over to the client. The privilege which English law recognises in the case of solicitor and client is no better justified than the privilege which English law declines to recognise in the case of doctor and patient. Members of the public can entrust their secrets to a solicitor with a guarantee against disclosure because, if they cannot fully confide in him, they lose the full protection of the laws. Members of the public may well demand similar non-disclosure on the part of their medical adviser lest they lose the full advantage of his advice. The judicial denial of medical privilege in England has been declared by a well-known legal text-book to be a rule "harsh in itself, of questionable policy and at variance with the practice and *code pénal* in France and the statute law in some of the United States." Advice on health is not of less public interest than advice on rights of property. For doctor or surgeon to win the patient's confidence is half the battle. The medical profession offers the public all the secrecy within its power. Unless the doctor is known to respect the patient's confidence, he will get neither the patient nor the confidence: but the principle of respect for confidence exists for the benefit of the public, not for the benefit of the doctor.

SKELETAL DISEASES OF DOMESTICATED ANIMALS

Last year, under the auspices of London University, Sir Arnold Theiler delivered at the Royal Veterinary College, London, three lectures on the osteodystrophic diseases of domesticated animals, and these have now been made accessible to a wider circle.[1] South Africa has offered him and his colleagues at the Onderstepoort department of veterinary research, Dr. P. J. Du Toit and Dr. H. H. Green, exceptional opportunity for the study of some of these diseases. Stijfsiekte, or stiff-sickness, is a phosphorus deficiency disease of cattle. The animals most affected are heifers with the first calf, cows in lactation, and growing cattle. They may develop an intense craving for bones, known as osteophagia, which compels them to travel long distances to find carcasses, and they may even kill and eat young lambs. On the veld the sound of crunching bones may sometimes be heard in the distance. The disease shows itself in retardation of growth and abnormal skeletal development, viz., thickening of the epiphyses of the leg bones, most pronounced at the metacarpus and first phalangeal joints. The gait is stiff and lame. In the young lactating animal there is usually rapid loss of condition, the lameness may become acute, and the animal tends to walk on its heels with hooves growing out. The bones may become fragile and fracture of the ribs and pelvis has been observed. Abnormal posture results, sometimes with curved spine, and in the last stages stiffness and lameness may prevent the animal from rising, and death from cachexia ensues. In the affected areas the soil and grass are found to be deficient in phosphorus—the hay may contain less than one-fifth of the normal amount—leading to a low level of inorganic phosphorus in the blood plasma, which may contain less than 2 mg. per 100 c.cm. There is no defect however in the calcium content of the fodder. Theiler and his associates have reproduced experimentally such aphosphorosis, and have shown it to be identical with the naturally occurring stijfsiekte. Low phosphorus rations were fed to heifers 12–18 months old in all of which the disease picture was produced in spite of daily exercise in brilliant sunshine, and no matter whether the calcium ration was high or low. The inorganic phosphorus of the plasma sometimes dropped to 1·3 per 100 even before the disease could be diagnosed clinically; blood calcium was normal. Vitamin deficiency had no adverse effect. Of the affected animals dying or killed some showed brittle, fragile, or fractured ribs, the whole of the skeleton being too light. In sections of bone Theiler found osteomalacia and rickets, in some cases in high degree, the osteoid seams being extremely wide. Further evidence that the condition was one of pure phosphorus deficiency was found in the fact that the disease could be prevented by supplementing the grazing with bran, which contains much phosphorus and little calcium. The routine preventive is bone-meal, of which the effective weekly ration is half a pound to two pounds a head, according to growth and lactation. This simple measure not only abolishes osteophagia and stijfsiekte, but leads to an increase of milk yield, better calves, more rapid growth of young stock, and superior fattening of adult cattle.

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[1] Veterinary Journal, April and May, 1934.

THEILER then extended his investigations to skeletal diseases of equines, using material supplied by STURGESS and CRAWFORD from Ceylon as well as collected by himself from South Africa. He was able to confirm the view that the disease known as "equine osteomalacia" by some and "osteoporosis" by others, is not strictly osteomalacia at all, but a different pathological entity more comparable to osteitis fibrosa of man. It is properly described as osteodystrophia fibrosa. Somewhat loosely applied in veterinary literature in the past, THEILER uses these terms in their precise histo-pathological sense. Thus osteomalacia is identical histologically with rickets, being the adult variety of this disease, and is diagnosed histologically principally on the evidence of broad osteoid seams. In osteodystrophia fibrosa the seams are not widened, but the bone is extensively destroyed by osteoclastic lacunar resorption; proliferation of osteogenetic fibrous tissue is unable to keep pace with the destruction. The picture is one of fibrous bone. Within the last seven years osteodystrophia fibrosa of equines has formed the subject of experimental research in Ceylon, Japan, and the Philippine Islands. Many have supposed the disease to be of dietary origin, tradition being in their favour in the sense that "miller's disease" or "bran disease" of horses must be considered as an osteodystrophia connected with one-sided feeding on cereals or bran. Bran being poor in calcium but rich in phosphorus it was suspected that osteodystrophia fibrosa was due to an unduly wide ratio of CaO/P_2O_5. Proof of this is now to hand. A survey of the experimental data makes it clear that the main cause of the disease is a diet of low calcium, high phosphorus content; the disease may, however, occur even when the calcium appears adequate if the phosphorus is grossly preponderant.

The osteodystrophic diseases of domesticated animals—rickets, osteomalacia, and osteodystrophia fibrosa—may all be regarded as dietary diseases, even if dietary factors are not alone responsible for them. Deficiency of phosphorus leads to rickets and osteomalacia in cattle, excess of phosphorus and inadequate calcium to osteodystrophia fibrosa in equines. The animals however differ in their reactions. A ration which produces osteodystrophia in the horse does not produce it in cattle—indeed that disease is apparently unknown in the bovine. In the dog rickets and osteomalacia arise from deficiency of vitamin D. The mineral metabolism of an animal normally depends upon the harmonious interaction of the three factors: vitamin D, calcium, and phosphorus. But we cannot as yet predict the effect of deficiency of one of them on any particular species of animal. Different pathological pictures appear to result from identical causes, and the same picture may be presented by diseases of which the causation is different. The part played by the endocrines and the possible significance of different mechanisms in the control of mineral metabolism is a field quite unexplored in domesticated animals. In concluding his third lecture THEILER asks himself: Why does the bovine tolerate a CaO/P_2O_5 ratio which induces osteodystrophia fibrosa in the horse; and why does the equine escape osteomalacia on pastures which induce that disease in cattle? He is unable to explain. We may yet, he thinks, have to call in a concomitant disturbance of the parathyroids, the result of toxic or infectious agencies, to provide a full explanation for the ætiology of osteodystrophia fibrosa, even though at present all the evidence may be in favour of mineral imbalance as the cause. We may hope that THEILER's work will be as successful in tracking down the different reactions of different animals to mineral deficiencies as he was in finding the causal agent, which now bears his name, of the deadly red water fever of cattle.

PROGRESS OF THE BED-BUG

As we noted last week in these columns the flea is declining. But on another page of the same issue (p. 222) the progress of the bed-bug was celebrated by its introduction as a "fundamental housing problem" into the House of Lords. As Lord CRAWFORD rightly complained, the bed-bug has suffered in the past from a taboo which has served to conceal a serious question of public health, and subsequent discussion showed that even in so well-informed a body as the House of Lords, knowledge of it is distinctly patchy. In other spheres the effects of this taboo can be surprising. It has been seriously asserted by some that to state the degree to which certain houses or districts are infested with bed-bugs is to insult our working classes; and the efforts of public health authorities to reduce this infestation have been condemned by others as unwarranted interference with the rights of (human) individuals. In the debate referred to, Lord CRAWFORD created the impression, unintentionally no doubt, that the bed-bug is a problem chiefly in new houses. That, of course, is not the case. In old-standing slum areas in London, obvious infestation has been shown to exist in 90 per cent. of the houses, the actual infestation being probably nearer to 100 per cent. But since the landlords of many of the new houses are themselves those same public authorities who are concerned in combating the bed-bug, it has come to them as something of a shock to discover that many types of council houses, with ceilings and partitions of asbestos sheeting concealing open spaces behind, provide in fact ideal haunts for the bed-bug—haunts which it is not slow to colonise, and from which existing measures of fumigation and so forth seem powerless to expel it. It is this accident of modern construction which has brought the bed-bug to the fore. Perhaps some simple modifications in construction may defeat the bed-bug in the future. Housing schemes cannot be indefinitely suspended until such methods have been evolved, but anyone familiar with the magnitude and complexity of the problem will endorse Lord CRAWFORD's plea that a few pounds devoted to research along insecticidal and biological lines, as advocated by the Ministry of Health's own committee,[1] would be well employed. At the moment the difficulties appear so great that the prospect is depressing. But when one recalls that, little more than a hundred years ago, probably all houses in this country harboured a greater or lesser number of bed-bugs, whereas at the present day, even in London itself, at least a quarter of the houses seem to be free of them, there is ground for hope that the inculcation of cleanly ideas and practices, coupled with more strenuous activities on the part of the sanitary authorities, may in time reduce the incidence of this infestation still further. That the community, from the House of Lords and the Ministry of Health downwards, should have become what Americans would call "bed-bug conscious" is an important step.

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[1] Reports on Public Health and Medical Subjects, No. 72. The Bed-bug. H.M. Stationery Office. 1934. 1s.

ANNOTATIONS

THE CASE OF THE DEAF

DEAF people, as has been frequently pointed out, receive little of the profuse sympathy expended on the blind: but is their deprivation lighter? The blind person gives less trouble to those about him than the deaf, though this may not be immediately obvious. He must be led, it is true, but all love to lead him, whereas a deaf person cannot be helped thus easily. If he has some hearing capacity others feel ridiculous when going to his aid by shouting at him—they do not shout because they are angry, as those around may assume, but, alas, they sometimes get angry because they are shouting. And the totally deaf subject throws another sort of responsibility upon his companions; they must speak always facing him, so that he can watch their lips, and their attention may be strained to follow his speech. Few have sufficient courtesy and patience to make the deaf feel that their disability is of small account, and consequently many deaf persons live cut off from much normal intercourse. The situation has been forcibly and beautifully put by Miss Margaret Monro in a small book addressed to the deaf and their friends, illustrating how much the deaf can help themselves, but how much self-help depends on the intelligent sympathy of their environment. To a great extent most of what follows forms a comment on Miss Monro's words, which should be read by all who appreciate what general society loses through the existing apathy towards the deaf among us.[1]

No special legislation exists to protect the interests of the deaf apart from that which entitles deaf children to suitable education. So far their cause has been chiefly the concern of the National Institute for the Deaf, a voluntary body, and of the Counties Associations for the deaf, affiliated to it, and including in their membership both voluntary societies and those local authorities sufficiently interested to join. The National Institute for the Deaf is maintaining three organisations for deaf women and working deaf boys, and acts as a clearing house for the work of the County Associations; it is largely administrative. How the deaf are helped, and how they may help themselves, is well set out in "All About the Deaf," a handbook of information published by the Institute.[2] This is a revised edition of a previous publication issued in 1929, and Lord Charnwood, the president of the Institute, lays emphasis in his preface on the distinction between the cases of the deafened and the born deaf with whom the prevention of deafness has not to be considered, while this is one of the chief objects for which the Institute exists. The handbook contains lists of ear hospitals, homes maintained by the Institute, and other homes and hostels for the born deaf, schools and welfare societies, schools for the partially deaf—a scanty list—training schools for teachers, scholarships for the deaf, and societies granting pensions. It also includes authoritative articles upon the ascertainment and prevention of deafness, the use of the gramophone and audiometer and upon the development of speech in the child born deaf. A section is devoted to existing legal provisions which at present are solely devoted to the educational needs of deaf children. No State inquiry into the conditions of the deaf had been made since 1886 until the Ministry of Health and the Board of Education, in 1930, appointed Dr. Eichholz "to obtain fuller information than is at present available on the position in industry of deaf and dumb persons and of the facilities for their education and training and securing employment." This report was published in 1932, and the recommendations from it are printed in the handbook and criticised in two memoranda, drawn up by the Institute and by the National College of Teachers of the Deaf respectively. Both deprecate the lukewarm tone of the report, for though they value it as embodying the result of the first investigation by the State into the needs of the deaf over school age, they feel that far too little attention has been given, in it, to the needs of the deafened, who form a much larger class than the born deaf. Members of the Institute are anxious to see the compulsory school age lowered to five years for children born deaf, for if speech is to be acquired it must be acquired young; at present these children need not attend school until the age of seven. For deafened children they would like to see an extension of suitable educational provisions and opportunities for school leavers to acquire vocational training. Earlier old age pensions for those who through deafness are unable to support themselves by their own labour would bring the deaf into line with the blind, and a request for this reform seems just.

These, and other proposals, were discussed at length at a conference of the Institute and the Counties Associations held last December, under the chairmanship of Lord Charnwood, the proceedings at which have just appeared.[3] The practical outcome of Dr. Eichholz's report, so far, has been the issue of two circulars by the Ministry of Health: one of these urges local authorities to make use of the powers they possess to contribute to associations in aid of the deaf and dumb, so helping them to place their beneficiaries in employment; the second circular, addressed to maternity and child welfare authorities, draws their attention to the importance of the early treatment of ear disease following the exanthemata due to nose and throat defects. The feeling of the conference as revealed by the published procedure was that these circulars urging, as they do, only a more extended use of existing provisions, do not go nearly far enough. Mr. Maurice Birley, chairman of the Institute, thought that existing provisions, in so far as they were compulsory, began too late and ended too early, being only concerned with nine years of a deaf person's life. The conference was strongly in favour of asking for a "Deaf Persons Act" which should guard the interests of the deaf in much the same way that the interests of the blind are guarded. Dr. James Kerr, representing the Scottish National Association for the Deaf, remarked that a large number of deaf people begin to go down after middle age and end as dependants: eight times as many deaf people as normal people are admitted to workhouses; it would be cheaper to help them to help themselves than to support them outright in this way. A Deaf Persons Act need not involve nearly as much national expenditure as the Blind Persons Act, because the blind must usually spend their whole working life in workshops, whereas the deaf, when trained, can find a place in the regular labour market. The three publications, here reviewed, set out the arguments for such an Act clearly and without padding or gush; they deserve the attention of all.

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[1] Breaking out of Prison. By Margaret T. Monro. London: Methuen and Co., Ltd. 1934. Pp. 116. 3s. 6d.

[2] All About the Deaf. London: The National Institute for the Deaf, 2, Bloomsbury-street, W.C. 1934. Pp. 122 and xxiv. 3s. 3d.

[3] Proceedings at a Conference held on Dec. 14th and 15th, 1933, between the National Institute for the Deaf and the Counties Associations for the Deaf. London: National Institute for the Deaf, 2, Bloomsbury-street, W.C. Pp. 54. 2s. 6d.

THE BLOOD IN PREGNANCY

FROM elaborate examination of the blood in normal pregnancy Dieckmann and Wegner[1] conclude that there is an increase in both blood and plasma volume beginning in the first trimester. At term the average increase in volume is 23 per cent. and in plasma 25 per cent., and at eight weeks postpartum there is an average decrease of 16 per cent. in both. These workers describe, as others have done, a definite decrease in the percentage of hæmoglobin, the number of red cells for 100 c.cm. of blood, and the volume of packed red cells. This decrease is, they claim, only relative; if the absolute figures are considered instead of percentages there is an increase both in hæmoglobin and red cells. The increase in plasma volume, however, is greater, so that the hæmoglobin and red cells show a relative decrease and absolute increase. Dieckmann and Wegner think this increase in blood and plasma volume and decrease in serum proteins, red cells, and hæmoglobin to be an effort on the part of the body to reduce the viscosity of the blood and thus to reduce the amount of work done by the heart, while at the same time the increased maternal tissue and the fœtus are adequately supplied. In fact they seem to support the old theory of an apparent physiological anæmia of pregnancy. The patients they investigated were, however, from the hospital class, and in view of the high incidence of chronic iron deficiency anæmia in women of this class and of the demands made for iron during pregnancy it appears possible that the degree of apparent anæmia that they record as physiological is really due to an insufficient intake of iron. Only further research can settle this point. They suggest that a hæmoglobin under 10 g. per 100 c.cm. of blood should be regarded as pathological, and since they accept Wintrobe's figure of 14·3 g. per 100 c.cm. as normal their pathological level is a low one. They also describe a fall in serum proteins per kilogramme of body-weight, and an increase in the total amount of serum protein, accompanied by an increase in plasma fibrin. The variations in plasma cholesterol in the same women is, they state, "enormous." There is an increase in cholesterol both per kilogramme of body-weight and when calculated in absolute figures, and this increase they consider to be associated "with other changes in the chemical equilibrium, which is so markedly disturbed in pregnancy."

RESEARCH ON CANCER

THE Cancer Control Organisation for Edinburgh and South-East Scotland was founded with the object of encouraging and coördinating clinical, pathological, and statistical research on cancer, of facilitating the earlier diagnosis and treatment of the cancer patient, and of establishing an efficient follow-up system for each case. The booklet[1] of 72 pages before us is the first report of the organisation, and it is intended to submit a similar report every year. The organisation has the support of many of the leading clinicians and pathologists of Edinburgh and the surrounding district. Mr. J. J. M. Shaw, chairman of the executive committee, gives in a few pages a clear exposition of the present state of the cancer problem as it affects man and explains the scheme of the organisation, which aims at obtaining a record of the treatment and results of every cancer patient in the area. The collaboration of the general practitioner is assisted by the provision of vouchers, which enable him to send necessitous patients without expense to Edinburgh for purposes of diagnosis, treatment, or for subsequent appearances at the follow-up department. The booklet contains the results obtained since 1930. The clinical material is divided according to sites in clear tabular form, with short explanatory remarks. With the lapse of time the reports will greatly increase in value by giving clear evidence of the efficacy of the different forms of treatment adopted for each site. The work of the organisation is to be welcomed. Its annual cost is estimated by the Marquis of Linlithgow, one of the hon. presidents, at £5000. Since the results will benefit the general public the organisation deserves a liberal financial support.

THE DEFINITION OF BLINDNESS

THE number of people on the blind register on March 31st, 1933, was 63,408. This figure necessarily depends on the definition and arrangements for certification. In its annual report[2] the Advisory Committee on the Blind recalls that the Minister of Health has repeatedly emphasised the desirability of having the examination made by medical practitioners specially skilled in ophthalmology. In a circular issued last October he entered more fully into particulars.

> A medical practitioner with special experience in ophthalmology should be taken to mean one "who devotes his or her whole time to the practice of ophthalmology in all its branches or who is in charge of the ophthalmological department of a general hospital of not less than 100 beds; failing such practitioner, one who *holds* a diploma in ophthalmology from a university (or other examining body recognised by the General Medical Council)."

This recommendation has now been adopted by 30 county councils and 47 county borough councils, and others are following suit. The chief difficulty, of course, is with the borderline cases. According to the official definition, a patient with vision between 3/60 and 6/60 *with full visual field is not to be certified* as blind, even though he has nystagmus. He is not, it may be said, debarred from some occupation for which eyesight is essential, such as some sorts of work on a farm, but in the present economic condition of the country the chances are that he will drift into the army of permanently unemployed. These cases form a difficult problem for the certifying surgeon, and it is quite possible that where one surgeon would refuse another would consent to certify. Would it not be a good plan for these surgeons to get together and compare notes about their actual practice, and for the Minister of Health to confer with them once more?

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[1] Dieckmann, W. J., and Wegner, C. R.: Arch. Internal Med., 1934, liii., 71, 188, 342, 353, 527, and 540.

[1] Edinburgh: E. and S. Livingstone.

[2] Eleventh annual report of the Advisory Committee on the Blind. London: H.M. Stationery Office. 1934. 4*d*.

THE EXPANSION OF THE R.A.F.

THE Air Ministry has announced a new system of entry designed to increase the number of pilots in the Air Force Reserve. The system provides for free flying tuition, and vacancies will occur for 40 candidates for direct appointment to commissions. Those only for the present will be eligible who have served in one of the squadrons maintained at Oxford and Cambridge and have obtained some flying experience and the certificate of efficiency. The selected candidates will commence their training at various dates in September at one of the reserve flying schools and the initial course will consist of a fortnight's instruction and 50 hours' flying, which would normally occupy about seven weeks. In addition to these 40 appointments applications are invited from civil pilots up to the age of 28 who are experienced up to the point needed to [illegible]st. There is no mention of the [illegible] passed any physical examination or of successful submission to any psychological tests. Perhaps both the civil pilots and the University candidates will be considered by previous training to have already satisfied official scrutiny in these respects, but the fact is not mentioned in the communiqué from the Air Ministry, while assuredly the public will expect reassurance on the point.

RADIOGRAPHY OF THE SELLA TURCICA

THE form of the sella turcica is affected not only by tumours of the pituitary body but also by tumours in its immediate neighbourhood and in remoter parts of the intracranial cavity. These changes have been analysed in considerable detail by Dr. Felix Smith[1] in a radiographic study of 500 cases of intracranial tumour at Prof. Brouwer's neurological clinic in Amsterdam. Abnormalities in the sella were found in 72 of them. A precise correlation between the type of sellar enlargement and the disposition of the tumour which is responsible for it appears, however, to be impossible; there is too much variability in such factors as the rate of growth of the tumour and the possibility, in young subjects, of compensation by widening of the sutures.

The pituitary adenomata cause in general a destruction of the floor, dorsum, and posterior clinoid processes of the sella without other radiological evidence of increased intracranial pressure. In this connexion it is noteworthy that P. Puech and L. Stuhl,[2] working at Vincent's clinic, report that they are able to distinguish radiologically between chromophobe and acidophil adenomata. In the former, they say, the sella turcica is enlarged in all dimensions but especially in the antero-posterior, while the bony walls of the sella are greatly atrophied. In the acidophil adenomata, on the other hand, the increase *in the size of the sella is principally in the vertical* direction and the walls, even while showing evidence of erosion, are thick. They attach great importance to the observation of an increased prominence of the tuberculum sellæ *in the acidophil type and* consider that this "bec acromégalique" (as they term it) is a diagnostic feature. At the same time it must be remembered that intracranial tumours, other than pituitary adenomata, may produce a very considerable destruction of the sella. Thus Smith has found that 58 per cent. of cases of supratentorial meningiomata and 52 per cent. of supratentorial gliomata gave rise to enlargement of the sella. In the gliomata this change was observed rather more often in the radiograms than were digital impressions and widening of the sutures—that is to say, evidence of a general increase of pressure. The combination of these general pressure signs and enlargement of the pituitary fossa is commoner in adults than in children, because in the latter compensation takes place through thinning of the cranium and separation of its sutures. Smith concludes that "a radiograph showing an enlarged sella in the presence of well-marked signs of increased intracranial pressure is almost certainly not that of a case of pituitary adenoma, and this even when the fossa is enlarged to the point of *obliteration of the sphenoid air sinus and complete* destruction of the posterior clinoid processes and the dorsum sellæ."

INDUSTRIAL HEALTH

THERE is so much medical research into diseases, their causes, treatment and prevention, that we are liable to forget the need for knowledge relating to health. The latest report[1] of the Industrial Health Research Board reminds us that study of health *reveals more problems than it solves.* Data are lacking about the physical condition of the working population as a whole, and about the incidence and kind of ill-health experienced in various occupations. *Initial difficulties* include the establishment of norms of physical fitness and of rates of sickness; indeed, the Board has to devise its own methods of approach and its own technique for each problem. Output, at best an indirect measure of activity, is no longer a sufficient criterion of health; yet it remains the only one available, except when some specific occupational disorder is under examination. An extension in the near future of firms employing their own medical staff and keeping records in comparable forms, seems to be the only hope for answering such a question as "Do puddlers suffer in excess from rheumatism?" Meanwhile, useful inquiry continues into environmental conditions. Improved lighting as tile-pressing gave an increased output ranging from 6 to 14 per cent.; noise has been shown to hamper the performance of weavers; warmth, ventilation and radiant heat affect the comfort of workers and can be scientifically adjusted. *Physical data are being* collected concerning men in different industrial occupations, and renewed attention is being directed to the psychological conditions of employment, such as personal reactions, likes and dislikes. Not least important of the investigations in progress is into accident proneness, which has already proved of such value and interest. The Board has done good work in the past, and the principles enunciated are steadily, *though slowly, being adopted in practice;* but much remains to be done in order to establish normal ranges of human physical fitness for different kinds of work, and the psychological cause of discontent and ill-health. While efforts on these lines are being made in this country, the progress of industrial medicine in civilised nations is watched by the International Labour Office at Geneva. Its report[1] for 1933 shows that world-wide action is being taken to prevent industrial poisoning from lead, mercury, phosphorus and other toxic substances, and that much is being done to meet the spread of anthrax and the ravages of silicosis, ankylostomiasis and occupational cancer. Legislation to protect women and children employed in industry is now in force in most countries, including Japan, India and China. It is fairly clear that unemployment and depression have led to malnutrition and morbidity in direct proportion to the non-existence in any country of social legislation on the lines of unemployment insurance, and throughout the report recognition is given to the part played by Great Britain in initiating and furthering industrial hygiene.

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[1] Birmingham Med. Rev., June, 1934, p. 66.

[2] Presse Méd., July 11th, 1934, p. 1131.

[1] Fourteenth Annual Report of the Industrial Research Board to June 30, 1934. London: H. M. Stationery Office.

SERUM TREATMENT OF ACUTE STAPHYLOCOCCAL INFECTIONS

Dr. C. E. Dolman's work on the treatment of acute staphylococcal infections has been attracting a good deal of notice in Canada, and it is interesting to see the first two instalments of his report on it.[3] The results obtained in his 104 cases are summarised in the first paper, while the second provides a more detailed description of 40 in which blood culture was negative. The striking difference between the mortality in these "negative culture" cases (4 deaths among 40), and in the "positive" (35 among 64), shows that staphylococcal antitoxin cannot be expected to work miracles in face of an established septicæmia with multiple metastatic abscesses. The same is of course true of every other anti-serum—they are all of greatest service when employed before the disease has progressed too far—but it applies with special force to staphylococcal infections, because in these every secondary lesion means tissue destruction and the formation of a new abscess. In Dolman's series, as in others, it is exceedingly difficult to form a definite estimate of the effect of the antitoxin, because no two cases of severe staphylococcal infection can be reasonably compared. Since no satisfactory controls can be provided, one has to rely mainly on clinical evidence of improvement. Such evidence is by no means always reliable, but in the present cases it seems to indicate that antitoxin is of real value; and the significant fact appears that clinical improvement was commonly accompanied by an increase in the antitoxin content of the patient's serum. Amongst the more severe cases are 32 of acute osteomyelitis in children, in which blood culture was positive before operation, and Dolman makes the extraordinary statement that the usual mortality in such cases is approximately 50 per cent.; whereas in this country it is held by many that in osteomyelitis a positive blood culture before operation is so common as to have little prognostic significance. The serum was usually given intramuscularly, since it was found that intravenous injection gave rise to serious reactions, and the dosage was very variable. Superficial infections, such as carbuncle, seemed to respond as a rule to less than 100 c.cm.; in other cases, with a more general type of infection, the amount given was sometimes very large, reaching a total of 600 c.cm., but there were some examples in which pyæmia and toxæmia appeared to respond excellently to moderate quantities. Dolman rightly insists that the serum should be given at the earliest justifiable moment, and this presumably would tend to obviate the necessity for very large doses. In his first paper he describes the preparation of the serum, and in setting forth the various properties of staphylococcal toxin makes out a strong theoretical case for using the remedy; but in this section the criticism can be made that although he recognises the importance of staphylococcal leucocidin in the pathology of the infection, he does not seem to have tested his antiserum for its ability to neutralise this factor—the production of which by different strains does not run parallel with the production of hæmolysin. Although, however, the papers may be in some respects open to criticism, they deserve serious attention, especially perhaps from clinicians, who are apt to regard all "antisera," with one or two exceptions, as of little value, if not actually dangerous. Although the use of staphylococcal antitoxin can never take the place of skilful surgical intervention, it may often be of great assistance in combating infection and limiting its spread.

THE AMBULANCE WORK OF THE ORDER OF ST. JOHN

THERE is confusion, it seems, in the minds of many as to the constitution of the Order, and particularly as to the distinction between the St. John Ambulance Association and the St. John Ambulance Brigade. This is a pity. The primary object of the Association is the instruction of persons in first aid and kindred subjects; and that it has achieved its purpose is shown by the fact that since its inception it has issued over 2½ million certificates to students successful at its examinations, and this figure increases annually by some 40,000 or 50,000. Thus there will be found in the ranks of the police, on the railways and other forms of passenger transport, in mines, in industry, in fishing vessels, in lighthouses and among coastguards persons trained to give first aid properly. So valuable has this expert knowledge proved that qualification in its principles is often insisted upon by employers of labour and the subject has been introduced into the curriculum of schools and education establishments.

The dividing line between the Association and the Brigade is that the former issues the text-books of the Order, arranges for lectures and examinations, grants certificates to those who pass, and teaches the practice and principles of first aid to the different classes of the community just enumerated. But the certificated persons all use their first aid knowledge on the premises where they are employed, in other words the lost time is the employer's time. The Brigade give their services away from the place of employment, in their own time and at their own expense. This is a body of voluntary unpaid workers of whom there are in this country some 60,000 men and women, and overseas some 15,000. They practise in their spare time so that they may retain and improve their knowledge of first aid, and they give up their leisure in the evenings and at week-ends and holidays to the service of the public.

The call on the services of the Brigade to-day has been made acute by the development of motoring, bringing a sad roll of accidents in its train. The motor abuses are being treated homœopathically by the motor ambulance service of the Brigade. This can now set over 250 ambulances in action and so relieve the local police in the case of street and road accidents, in addition to transporting ordinary medical cases to centres of treatment.

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[1] Industrial Medicine in 1933. International Labour Office Year-Book, Geneva, 1934.

[3] Canad. Med. Assoc. Jour., June and July, 1934

CALMETTE'S ORDEAL

To the July number of the "Annals of Medical History" (New Series, Vol. 6, No. 4) Dr. K. E. Birkhaug, of Paris, communicates a short biography of Calmette to which we must apply the familiar adjective of charming. Both the facts of Calmette's wisdom and the traits of Calmette's character are brought out clearly, and certain passages in which the hardships inflicted on the French population by the German invaders in the early part of the war are illustrated by the methods employed to involve Calmette in charges of espionage which, if established, would have cost his life. When he was taken prisoner in his laboratory at the capture of Lille, he was accused of sending wireless messages to the French headquarters, it being suggested that his experimental pigeons were employed as messengers. His laboratory was ransacked and (damning fact) certain of his pigeons were found to be ringed with serial numbers. These pigeons, Calmette declared, were being employed in an investigation into the transmission of fowl tuberculosis, but the explanation was received with incredulity and the pathologist was placed under a threatening guard. Never was the value of keeping orderly records more dramatically shown. Calmette's files were searched through, and the bill of purchase of the birds was found, proving that the birds when *delivered were already distinguished by serial numbers.* The numbers could not therefore have reference to any secret code. An autopsy of the birds was ordered and was performed by a German pathologist, but only one pigeon was examined. It proved to be tuberculous and the accusation against Calmette was withdrawn but without apology. Calmette's comment is curious. "Fate," he said, "has played me a great boon, for among all the pigeons inoculated with the tuberculous material the pigeon examined was the only one that had contracted tuberculosis."

FINANCIAL SITUATION OF THE LONDON VOLUNTARY HOSPITALS

In its annual statistical review of last year,[1] King Edward's Fund *is able to record two remarkable facts.* In the first place the total maintenance income of the London voluntary hospitals exceeded £4,000,000 —which is unprecedented. Secondly, and perhaps more important, the number of hospitals with surpluses was higher than ever before, while the number and aggregate total of deficits were lower than ever. The voluntary gifts to the maintenance of the 145 hospitals covered in the review amounted to £1,830,000, or £133,000 more than in 1932. This was due to an increase of £152,000 in legacies, and these of course fluctuate in amount, though they have never in the last five years been less than £357,000. When receipts for building and endowment are included, the sum of the voluntary gifts in 1933 was no less than £2,239,000, an increase of £65,000 over 1932, while "receipts for services" again showed an advance, reaching a total of £1,536,000. The increase of £167,000 in the total income of the year more than covered the small increase of £29,000 in maintenance expenditure, and the net result was that the aggregate surplus of income over expenditure was £242,000, the highest recorded for ten years. Again, the number of hospitals with surpluses increased from 85 to 98, and those with deficits decreased from 60 to 47; the total amount of the surpluses rose from £201,000 to £303,000, and the total amount of the deficits fell from £97,000 to £61,000. The authorities of the Fund have good reason to congratulate themselves on these figures, which testify, it is held, how well in the aggregate, throughout the recent years of financial pressure, the current needs of the hospitals have been met, and how much has been done to *improve and extend their accommodation* and equipment.

RADIOTHERAPY OF UTERINE CANCER

In connexion with the international congress of radiology just concluded at Zurich, the Health Organisation of the League of Nations convened a conference to advise on the further prosecution of its international inquiry into the results of the treatment of utrine cancer by radium and X rays. At *this* conference, which met from July 21st to 23rd, Sir George Buchanan and Dr. Boudreau represented the Health Committee of the League, and the experts attending included Sir Comyns Berkeley and Colonel A. B. Smallman (England), Prof. Lacassagne (France), Prof. G. Forssel and Dr. Heyman (Sweden), Prof. van Rooy and Dr. Jansen (Holland), and Prof. Murdoch (Belgium). The Conference recommended that statistical statements with commentary should be annually issued, beginning next year, and relating especially to survivals for a minimum period of five years after the initial treatment. The principal object of these statements is regularly to present statistical information about the results of radiotherapy applied to patients suffering from cancer of the cervix at different stages when certain agreed rules for compilation of the data have been observed. It is proposed that the data should be obtained through special correspondents in different countries, and that the annual statements should be prepared under the advice of a small advisory council appointed by the Health Committee of the League.

FACTORIES AND WORKSHOPS

The annual report of the Chief Inspector of Factories and Workshops for 1933 is published this week (H.M. Stationery Office. 2*s.* 6*d.*). *It includes* a general description of industrial development, numerical summaries of the accidents falling under the indicated headings, notes on the safety organisations, and on the accident rates in the different industries. *Sections on health and employment* precede one describing certain large welfare schemes, and the report closes with a series of tabular statements supporting the general conclusions of the document.

INDEX TO "THE LANCET," VOL. I., 1934.

The Index and Title-page to Vol. I., 1934, which was completed with the issue of June 30th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of The Lancet, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Large Bequest to a Cottage Hospital.—It *is* now announced that the sum payable to Melksham Cottage Hospital, Wiltshire, under the will of the late Mrs. L. Ludlow-Bruges will be nearly £196,000. The hospital has at present 30 beds and its invested funds are about £2000.

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[1] Statistical Review of the Work and Finance of the London Voluntary Hospitals for the Year 1933. King Edward's Hospital Fund for London. July, 1934. Pp. 32. 1*s.*

PROGNOSIS

A Series of Signed Articles contributed by invitation

XIII.—PROGNOSIS IN INJURIES OF THE ELBOW-JOINT

INJURIES about the elbow-joint give rise to more anxiety than those involving any other joint in the body. Permanent stiffness will result in a certain proportion of the cases in spite of the utmost skill and care. No joint is quicker in taking advantage of the slightest error of judgment on the part of the surgeon. Complications, some of them rarely seen elsewhere, are not very uncommon, and these may be extremely serious. On the average dislocations involve a greater risk of permanent limitation of movement than fractures, though the most serious of all complications, ischæmic paralysis, usually follows a fracture. Some of the minor fractures—e.g., of the radial head, and of the coronoid process, and separation of the internal condyle, are produced by what we might term attempted dislocation, the whole joint being severely wrenched. This explains in some cases the unexpectedly poor results, though the excessive amount of swelling should have warned the surgeon of the true nature of the damage.

In children the supra-condylar fracture of the humerus is the commonest lesion. Transcondylar fractures and separation of the epiphysis are much less common and demand no separate consideration. The fracture is very rarely compound, and if it is—the skin wound is usually no more than a puncture—the prognosis is but little affected. It is of paramount importance that in all these fractures the displacement, often considerable, should be corrected without delay. If the reduction is at least fair, if not perfect, and as a result flexion is obtained without undue force, and is maintained for a sufficient time, the prognosis in the vast majority of cases is excellent. It is essential, however, that after fixation for four weeks, movement should be restored only by relaxation of the fixation apparatus and by encouraging active use of the arm: all passive efforts to extend the joint must be avoided. Too vigorous treatment by an ambitious masseur alone can be responsible for a disastrous result unless the error be discovered in time. The worst mistake that can be made is to give an anæsthetic and forcibly to extend the joint. Such treatment invariably makes matters worse and produces the opposite effect to that anticipated. Supposing the lower fragment is still displaced behind the upper and yet, in spite of the risk, flexion well above a right angle has been achieved, the final result, although in jeopardy, is by no means hopeless. Some of these cases in which the "setting" of the fracture has failed, nevertheless give good results.

Operative reduction in a difficult case should only be considered within the first few days. Late attempts—i.e., after the first week at the most, to correct displacement by open operation are to be condemned; the prognosis will be worse rather than better after such interference. In a case seen some weeks after the injury with flexion checked by the displaced upper fragment, the outlook as regards full flexion, though bad, is not hopeless. In some cases, at any rate, as a result of absorption of the bone in front, full flexion may be gradually restored in the course of several months. Although this happy progress cannot be relied upon with confidence, the possibility should always be waited for. A not uncommon error in the setting is a tilt inwards of the lower fragment, which eventually produces the gun-stock deformity, or cubitus varus. This can be revealed by X rays after setting, and should always be looked for; an effort should be made to overcome it by a second manipulation, though this is difficult. If it is not detected till later, it is better not to operate, but to wait till extension is restored and then see whether the degree of deformity warrants osteotomy. This deformity sometimes causes considerable inconvenience, besides being unsightly.

Fracture of the elbow-joint may involve injury to one of the main nerve trunks. As a rule complete recovery follows conservative treatment. Very rarely the median nerve is gravely damaged or even divided.

TWO GRAVE COMPLICATIONS

Besides limitation of movement due to fibrosis of the capsule or permanent displacement of the fragments, two grave complications may be met with: (1) ischæmic paralysis or contracture, and (2) myositis ossificans.

Ischæmic paralysis.—This is usually associated with an excessive amount of swelling, and almost without exception a considerable degree of unreduced displacement. Possible contributing factors are flexion of the joint beyond the limits of safety under the circumstances, and tight bandaging. The complication can be avoided by adequate reduction of the displacement, by not flexing the joint till this is achieved, and by fixing the forearm at an angle somewhat lower than it is possible to flex it without undue force. Though the ischæmia is now said to be due to acute venous obstruction, feeling the radial pulse at the wrist when the joint is setting is a useful guide. If, in spite of every care, signs of ischæmia develop, considerable improvement may be achieved by freely incising the deep fascia and thus relieving tension: the degree of flexion should be reduced and the arm placed on a pillow. By these means a case with a very black outlook may eventually give an excellent result, at any rate so far as *ischæmic* contracture is concerned. If the condition is well established the prognosis is undoubtedly very bad. Though gangrene, except for a patch of skin, is uncommon, complete recovery from any but the mildest degree of this complication is impossible.

In so-called *myositis ossificans*, calcification and ossification occur in the capsule or muscles or both. Here again the early recognition and prompt treatment of the condition have a profound influence on the result. This is true of children to a far greater extent than of adults, in whom the prognosis is much less favourable. If the complication is recognised early in a child and promptly treated by complete and absolute fixation of the elbow, the opacities seen in the X ray often disappear within a few weeks, and the result may be still be perfect. If, however, abnormal shadows are seen both in front and behind, if the true nature of the trouble has not been recognised early, and particularly if it has been aggravated by injudicious attempts to force a return to mobility, then the outlook as regards mobility is extremely bad. However, even in such cases patience may eventually be rewarded. In adults the response to prompt treatment is usually disappointing, and the prognosis is much less promising, though even here movement may return after many months of fixation. Removal of the new-formed bone in the early months is worse than useless. Later, operation offers a chance of increasing the range of movement, but anything approaching a perfect result must not be expected. This complication is also met with after dislocations.

DISPLACEMENT OF THE CONDYLES

Separation of the [illegible] is probably produced by forcible [illegible] forearm, and therefore the joint may have been severely wrenched; if treated by simple flexion, as a rule the prognosis is good. The desire to avoid even the slightest disability in a lad who has shown an exceptional aptitude for games may justify operation. Occasionally the separated epicondyle is sucked into the joint and caught between the humerus and ulna, and this may occur with or without complete dislocation. Open operation is usually necessary and the prognosis is not quite so good as in simple cases. The ulnar nerve may be bruised, but usually recovers after the operation. Condylar fractures which involve the articular surface, are more serious. The external condyle is more commonly displaced in children, and, as a rule, the loose fragment is rotated on an antero-posterior axis, often through an angle of more than 90 degrees. This calls for open operation: the result, though good, is often imperfect. When the true nature of the lesion, particularly as regards the rotation of the condyle, has been overlooked, the result may be surprisingly good in spite of the fact that union has failed to occur. The carrying angle will be accentuated. By the time middle age is reached osteo-arthritic changes will be giving trouble, while in addition there is always present the possibility of neuritis of the ulnar nerve. This complication may commence many years after the fracture. Fragments chipped off the head of the radius and displaced should be removed without delay; the outlook is then good. If their removal is delayed, when superior judgment should have led to their removal earlier, the result is much less favourable.

FRACTURE OF THE NECK OF THE RADIUS

The final result in fracture of the neck of the radius depends on the ability of the surgeon by open operation to restore the head to something very close to its normal position. The younger the patient the more likely is this to be achieved. If it has been found necessary to remove the head of the radius, permanent weakness may result: later osteo-arthritic changes are inevitable. In a child, when the head cannot be restored to perfect position, and yet its removal is considered unnecessary and inadvisable, a guarded prognosis should be given. The result may be good, but is often imperfect.

DISLOCATION

Dislocations in children as a rule do well, and even in adults the results are often surprisingly good. Each case, however, should be regarded as one of potential myositis ossificans and treated with the utmost gentleness after reduction. In dislocation of the radius alone, the results depend on the early course of the case. If dealt with promptly, and successfully, the reduction being apparently stable and easily maintained by simple flexion, all should be well. If, on the other hand, delay has occurred before reduction is attempted, or, when attempted, difficulties are encountered and, though apparently reduced, the head is unstable, and when perhaps a second anæsthetic is given for further efforts to be made, permanent impairment of function to a varying degree is certain to occur, particularly in adults. Periarticular calcification and ossification can occur with surprising rapidity in some of these cases.

COMMON FRACTURES IN ADULTS

In adults the common fractures involve the olecranon, the head of the radius, or the coronoid process. *Olecranon* fractures with displacement are treated as a rule by operation and give excellent results. The *probability of osteo-arthritic changes* depends largely on the operative skill of the surgeon. Even in elderly patients the results without operation and with movements commenced not later than four weeks after the fracture may be all that they require. Fractures of the *head and neck of the radius*, whether operation is deemed advisable or not, do fairly well if treated by early active movements and massage—i.e., as soon as the wound has healed if operated upon and sooner if not. Fractures of the *coronoid* probably result from "attempted dislocations"; the severity of the general damage to the joint and the degree of the resulting swelling determine the final result. The more severe the injury appears to be the greater the need for initial rest and extra care in restoring mobility. It is unwise in an adult to maintain flexion above a right angle for more than a fortnight.

LESS COMMON FRACTURES

Of the less common fractures, a *transverse juxta-articular fracture of the humerus* is always difficult to treat, since any attempt to move the elbow before union is firm only results in bending the callus and delaying the union. T and Y fractures should be treated by operation and, if possible, fixation of the fragments, so that movements may be commenced reasonably early. Much depends on the skill of the surgeon and the accuracy of the replacement. These are grave fractures and, on the whole, the results are far from perfect. Severe trauma to the elbow, even in the absence of clear evidence of fracture, may lead to the formation of loose bodies in the joint, with impairment of function and a varying degree of disability. This is more commonly seen in adults than in children. In some cases the capitellum is broken away and displaced forwards and upwards. Its prompt removal—it is rarely possible and wise to replace and fix it—leads to a fairly good early result, but eventually, as after removal of the radial head, it is certain to be marred by osteo-arthritis. In assessing the degree of disability likely to occur after a particular injury of the elbow-joint, the sex, occupations, and work of the patient should be given every consideration.

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ROYAL SEA-BATHING HOSPITAL, MARGATE.—The report of this hospital for 1933 shows that the average daily number of occupied beds was 308, the same, within a minute fraction, as in the preceding year. The average cost per occupied bed was £117 10*s.* 11*d.*, as against £122 18*s.* 10*d.* in 1932. The medical superintendent, Dr. R. W. Armstrong, reports that the proportion of cases discharged as "quiescent" reached the satisfactory figure of 77 per cent. for those suffering from surgical tuberculosis, and 61 per cent. for the non-tuberculous. The latter group comprised a considerable number of cases which were not susceptible of cure. Last summer there were few days on which heliotherapy was unable to be practised. He adds: "There were long periods, however, when wind, which is ordinarily so characteristic of the climate of Thanet, was completely or almost completely absent, and it was noticeable that during these periods many patients tolerated sun-treatment relatively ill, and on the whole one rather formed the impression that less benefit accrued than in the more normal type of summer."

SPECIAL ARTICLES

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

BOURNEMOUTH, according to its medical officer of health, Dr. H. Gordon Smith, is a place of peace[1]; for the young and active desiring stimulation and excitement, he adds, the district is not suitable. We do not dispute his dictum that "at certain times of the year it has a soothing effect," but last week, at any rate, it provided enough stimulation and excitement not only to satisfy the young but to rejuvenate the elders. The first two days of the Representative Meeting furnished ample controversial matter to enliven dinner tables over the week-end but, in fact, a sunny atmosphere prevailed on Sunday, which for the most part was spent out of doors in cars or boats, some private parties were arranged, the facilities offered by the Corporation of Poole at a new bathing centre at Branksome Chine being much appreciated. A large contingent accepted the same Corporation's invitation to lunch and a tour round the harbour on motor-boats. In the evening the famous municipal orchestra of Bournemouth, under Sir Dan Godfrey, gave a Wagner concert. During the first days of the following week the representatives, still hard at work, were gradually joined by visitors from "those two long, dull, parallel streets where, it is commonly believed, the waters of healing are laid on at the main." At the president's reception on Tuesday the guests filled the ballroom of the Pavilion, and also the huge concert hall, where music, a variety programme, and films were provided in turn for those who did not want to dance. Some had been up before nine that morning to attend the opening by the president of the exhibition of surgical instruments and appliances, food, drugs and books set out in the Winter Gardens; a far greater number were roused very early on Wednesday by the fear that they would be too far back in the queue to acquire tickets for the dinner and dance to be held on Friday at Southampton, on board *R.M.S. Aquitania*. The mornings of this and the two following days were taken up by the sectional meetings held at the Municipal College, in which the available accommodation had been nicely adjusted to the expected distribution of members. For the most part, estimates of attendance had been fairly accurate; on the first day only the debates on ante-natal care and on the use of narcotics in the treatment of nervous and mental patients (see p. 272) were held in somewhat over-crowded rooms, while larger ones appeared to be less well filled. The pathological museum, in the spacious basement, contained some interesting material, notably a "clinical picture gallery," mostly dermatological, exhibited by Dr. Watson Smith; the specimens and photographs of pancreatic and renal changes in mental patients lent by the Royal Bethlem Hospital; a series of malignant tumours experimentally produced by methylcholanthrene at the Research Institute of the Cancer Hospital (Free); and the exhibit of parasites, mostly tape worms, and capsules and cysts recovered from human muscle and brain, lent by the Royal Army Medical College, Millbank. Most of the sections concluded their discussions each morning in good time for lunch, and the afternoons were spent at garden parties in different parts of Hampshire and Dorset, in tours by land or by sea, or in recumbent posture on bed or beach in preparation for renewed activity at civic reception, Association dinner, or popular lecture in the evenings. The most flattering tribute to the efficiency of the secretariat of the Association, which is ultimately responsible for the organisation of these annual meetings, was the general acceptance of the good things offered to the mind and the body without comment, as part of the traditional hospitality of the British Medical Association.

PROCEEDINGS OF THE REPRESENTATIVE BODY

(Concluded from page 202)

The Staffing of Welfare Centres

THE provision of any pegs in the wall by which whole-time medical officers might "climb into the orchard of the general practitioner and steal his diminishing stock of fruit" was deprecated by Dr. B. H. PAIN (Tunbridge Wells) in connexion with the qualifications to be demanded of officers of welfare centres. Prof. R. M. PICKEN, as chairman of the public health committee had brought forward the motion that "it is desirable" that such officers "should have had experience in general practice." Manchester, in the person of Dr. A. Gregory, wished to strengthen this pronouncement by substituting the word "essential" for "desirable" and by specifying two years as the minimum period of such experience; while Newcastle wished to extend the period to three years. Dr. PAINE feared that insistence on this proviso would strengthen the influence of the full-time medical officer, who would be able to say: "I've been in general practice, and *I know*." Sir HENRY BRACKENBURY emphasised the danger of adopting a policy in conflict with the agreement embodied in the Askwith memorandum on salaries of whole-time officers in public health services. Under this memorandum a period of three years' professional experience "in the practice of his profession" was required of a candidate, not more than one of these years being spent in public health work as a temporary officer. Sir Henry held that it would be unwise to alter this arrangement while it was acceptable to those concerned as prospective employers and employees. Dr. E. H. T. NASH supported this view, and Prof. PICKEN pointed out that while a medical officer of a welfare centre should have some knowledge of conditions in the homes of the people, which could well be gained in general practice, insistence ln a prolonged experience would so extend the period of apprenticeship for public health work as to discourage men from attempting to enter a branch of medicine which held out no glittering prizes, even to its most successful votaries.

It was agreed to adopt the motion, leaving the time of experience in general practice unspecified.

The Use of Anæsthetics and Analgesics by Midwives

Prof. RALPH PICKEN drew attention to the action of the Council in informing the Ministry of Health and the Central Midwives Board that "it views with apprehension the proposed extension of the freedom of the midwife to administer drugs on her own responsibility, believing it to be dangerous and contrary to the public interest." Sir EWEN MACLEAN supported this action, on the grounds that the indiscriminate use of drugs by midwives would have serious results to the patient. It would lead not only to a rise in the forceps rate, but to difficulty in maintaining asepsis. A committee of the College of Obstetricians and Gynæcologists had been appointed to look into the question of the use of drugs by midwives; at the present time, influential persons were pressing for a relaxation of the rules in what Sir Ewen deemed an unwise fashion. Sir Henry Brackenbury said that the medical profession were not less anxious than the lay public that relief of pain in childbirth might be available for the poor as well as for the rich woman. Their opposition to the use of analgesic drugs by midwives on their own responsibility arose not from a jealous regard for their own emoluments, but from concern for the welfare of the patient. No administration of chloroform or ether could be made quite foolproof, and a full medical training should be required from those to be entrusted with their use. Possibly a new method of giving nitrous oxide, now under trial, might be made foolproof, under district as well as under hospital conditions; if the anæsthetic could be administered by the patient herself rather than by the midwife, the problem might be solved.

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[1] The Book of Bournemouth. A series of 23 essays, richly illustrated, edited by Dr. S. Watson Smith. Bournemouth: Pardy and Sons. 1934. Pp. 212.

The section of the supplementary report on public health, in which the attitude of the council on this matter was made clear, was adopted.

The Law relating to Abortion

The question whether the council should itself initiate a general inquiry into the law relating to abortion or should merely express willingness to contribute expert medical assistance or evidence to any committee set up by the Government on this subject was eventually settled by the decision to set up a committee with a limited reference "to consider and report on the medical aspects of abortion."

Dr. J. W. Bone, as chairman of the public health committee, pointed out that the subject falls under two main heads: (1) therapeutic abortion, and (2) abortion used as a normal method of decreasing the number of births. With regard to (1) it had been said that some practitioners are unwilling to induce abortion on therapeutic grounds, because they are insufficiently protected by the existing law; the council of the Association did not believe either that practitioners failed in their duty in this respect or that protection was insufficient. With regard to (2), abortion was legalised in certain European countries, and in Soviet Russia it had been stated that 11,000 abortions had been performed in a year with no deaths and few cases of septic infection. It was the information that the mortality and morbidity associated with the operation were so much reduced when it was legalised that had attracted the attention of certain medical men to the legal position. The council took the view that this was a broad public issue rather than a purely medical one, and had thus put forward a restricted proposal for the appointment of a committee on the medical aspects of abortion. In the course of the discussion, it was said that democratic governments tend to shirk issues of this kind, and that a corporate body of 100 years standing could, and should, give guidance and help to form and educate public opinion. Dr. Parry, of Brighton, was not satisfied of the wisdom of setting up a committee unless the Government established an inquiry on broad lines, since the *medical* indications for abortion were already well known; Dr. Hawthorne agreed that these were clearly set out in text-books and appeared to be concerned lest the committee should venture too far afield in its deliberations and report. Dr. E. R. C. Walker held that the profession was concerned with the whole personality of the patient, not only with her physical condition; and Dr. J. S. Manson, for Warrington, obtained an assurance on behalf of the council that the forensic and preventive aspects of the subject would not be ignored. The suggestion that the matter might safely be left to obstetricians and gynæcologists was opposed by two prominent members of this specialty, Prof. James Young and Sir Ewen Maclean. The former held that difficulties arose in practice because the law was uncompromising in regard to penalties and yet left the circumstances under which action was permissible very vague. Sir Ewen Maclean regarded it as an important duty to ascertain whether this grave social menace was as prevalent in this country as had been suggested. He found it difficult to believe that the rough-and-ready methods of inducing abortion, said to be practised on a large scale in Russia, were really so free from mortality and morbidity as had been claimed.—Dr. E. W. G. Masterman held that a pronouncement, following investigation by the Association, was highly desirable; an appalling number of cases of abortions was received in municipal hospitals.

In spite of gloomy forebodings by Dr. Hawthorne the meeting eventually decided to set up a committee with the limited reference indicated above.

Secret Remedies

The publication many years ago of the book entitled "Secret Remedies" was described as one of the best pieces of work done by the Association, in a motion by Kensington pressing for its periodical re-issue. The proprietary remedies on the market had altered greatly since 1914, and there was a general demand for information as to their content. Sir Robert Bolam and Mr. Souttar pointed out the difficulties of the proposed task, which had to be approached with great caution, and the motion was accepted in a modified form.

The Direct Representatives

Speaking for Marylebone to a motion—

> That the council be requested to consider the arrangements under which the selection of candidates within the British Medical Association for nomination to the General Medical Council is at present conducted, with a view to removing if possible the objections which have been advanced against the existing practice—

Dr. B. Spurgin outlined the present procedure. A meeting of the profession was summoned in every divisional area to select by vote the candidate most approved; then in the town where the annual meeting was held a meeting of the representatives of the English and Welsh constituencies was summoned to make a final choice from among those nominated.

The principle underlying this procedure was that the Association would support the candidate favoured by the majority of the local professional meetings, but in this case no central meeting need be held, since the results of voting in each area could be sent by post to headquarters. If no such meeting had been held in any area, then the representative of the area had no right to vote. On the present plan the vote at the central meeting was taken by a ballot and there was thus no guarantee that the representatives did actually vote according to the opinion expressed by their divisions. One of the complaints, especially in the provinces, was that under the existing scheme no candidate had any chance unless he happened to be a prominent member of the B.M.A.; and again, that a candidate who wished to stand and had the support of his division was excluded from testing the feeling of the whole constituency.

It was sometimes said that the central meeting was not a meeting of representatives or of members of the Association, but of the whole profession, but a meeting open to the whole profession could hardly be called into existence at the particular town in which the B.M.A. annual meeting is held.

Dr. Hawthorne, supporting the amendment, said that no one doubted that under the existing scheme the best possible representation had been secured, or that the active interest taken by the Association in the election had given it a vitality previously lacking. It was sought only to regularise procedure by some means. On this understanding the motion was passed.

Miscellaneous Business

Many of the sections of the Council's report were adopted either with little comment or after discussion which led to no material results in amendment of motions, though often points of general interest emerged. For example, a motion by Dr. J. Cohen (for Kensington) that though separate sessions for contributing patients in V.D. clinics were open to objection, the principle of payment for services rendered should be encouraged, was lost, the meeting accepting the view expressed by Dr. Nash and Dr. Willoughby that to exact a fee from any patient would harm the work of the clinic.—The announcement by Dr. Le Fleming, as chairman of the relevant committee, that the Report on Nutrition had been an outstanding success, more than 12,000 copies having been sold, was received with enthusiasm. For the first time, he said, the calorie had been translated (1) into terms of food, and (2) into terms of money, and this could be reckoned a great achievement.—Mr. Bishop Harman's favourable report on the progress of the National Ophthalmic Treatment Board also caused general satisfaction. The memorandum of evidence tendered to the Departmental Committee on Health Services in Scotland by the Scottish committee of the Association was presented by Dr. J. B. Miller. The criticism that it should have been submitted to the divisions for approval was fully met by an explanation of the time factor, and no other major criticism of its provisions was offered. Dr. Walker's description of the document as a better exposition of B.M.A. policy than any hitherto issued was received with good-humoured applause.

THE ANNUAL DINNER

Dr. S. Watson Smith, the President, took the chair at the annual Dinner held on Thursday evening. Sir Crisp English proposed the health of the county borough of Bournemouth, expressing the appreciation of the Association of the hospitality it had received. There must, he said, be thousands and thousands of people who would gladly join in this toast in gratitude for the return of health. The Association wished him particularly to express its recognition of the coöperation that existed in Bournemouth between the authorities and the medical profession. He concluded with a tribute to Sir Dan Godfrey, the director of the municipal orchestra.—Alderman J. R. Edgecombe, mayor of Bournemouth, responded, attributing a great part of the popularity of the town to the recommendations of doctors in years gone by. The town had changed its character, from being a health resort only to being also a pleasure resort. It put the finishing touches to the healing work the medical man had started.

The Earl of Malmesbury proposed the health of the Association, which he described as one of the most important bodies in civilisation. Laymen recognised to the full the magnificent work that the Association was doing.—Sir Henry Brackenbury responded, observing that the reply to this toast was the last duty of a retiring chairman of council and offered congratulations to his successor, Dr. Kaye le Fleming. He expressed gratitude to the towns of Bournemouth, Poole, and Christchurch for their abundant generosity and kindness. There had been of recent years two special features of the Association's work: the number and wide extent of the overseas representation and the activities of the Association as a great social service. The Association was not only a great medical but also a great imperial concern. The interests of the profession were one and the same as the interests of the public. The health of the people had become increasingly a concern of the State and of the local authorities, but there were many overlapping interests and neglected opportunities. The Association had always been in the forefront of the communal concern for health. It was not unreasonable to expect the authorities to consult and use the medical profession. The services of the State, though preventive in aim, had become largely clinical in their expression. There were still some local authorities which had not been wise enough to accept the aid proffered by the Association which, he assured them, was proffered in no wish to gain more work and emoluments for its members, but in order that it might play its part in social service.

Dr. F. W. Broderick proposed the health of the Guests, to which Sir Henry Page-Croft, M.P., and Dr. D. M. Embleton (Melbourne) responded.

Dr. E. K. le Fleming proposed the health of the Chairman. He said that the local division, recently in a great difficulty, had followed scriptural advice to look to the hills for help, and had looked to Scotland, finding among themselves an exile from that land, bearing his lot with patience and fortitude. The position which the president-elect had been unanimously chosen to fill was no easy one; Dr. Watson Smith had already undertaken many tasks in connection with the annual meetings, including the publication of the "Book of Bournemouth." For the first time in its history, the Association proposed to carry the flag right round the world during the President's year of office. The hospital question, in which he took keen interest, was going to become of universal importance during the next few years.—The President, in reply, declared that he had not come South in search of gold, but of something far more valuable—viz., health. He had deliberately chosen Bournemouth to live in and later to work in.

ANNUAL GENERAL MEETING

The new president, Dr. S. Watson Smith, was formally inducted to the chair on July 24th at the 102nd annual general meeting of the Association. Prof. T. G. Moorhead, in investing him with his badge of office, referred to the sympathy felt for Mr. F. W. Ramsay, lately president-elect, who through ill-health found himself unable to proceed to the chair. At a moment critical for the Bournemouth meeting, he said, Dr. Watson Smith had stepped forward and guided the organisation with evident success. The incoming president spoke of the gifts of intellect, manner, and heart that his predecessor had brought to his year of office and, in reply to a vote of thanks moved by Sir He[illegible] Brackenbury—"not merely as an expression of th[illegible] to the president, but as a tribute to the man"—Dr. Moorhead referred to the help given him by his wife and the consideration shown him by the officers of the Association. He expressed his hope that, during the coming year, a much larger and more united medical organisation would be formed in Ireland than any now existing, and that it would be an integral part of the British Medical Association.

SECTION OF MEDICINE

Prof. W. LANGDON BROWN (Cambridge) presided over this section, and Dr. A. F. HURST (Windsor) opened a discussion upon

The Clinical Importance of Achlorhydria

Dr. Hurst said it was most important to determine how achlorhydria could be prevented or, failing this, how to cure the underlying condition instead of merely treating it symptomatically by means of artificial gastric juice. Referring to some fundamental facts concerning the physiology of the stomach, he said that protein digestion was carried on equally well in the intestine in the absence of pepsin and hydrochloric acid. The antiseptic action of the gastric juice was more important, since it protected against infection with bacteria present in food and drink. Dysentery and similar infections occurred much more commonly in people with achlorhydria or hypochlorhydria, and he was sure that the Services would save much invaliding if men with achlorhydria were not sent to the tropics. The diminished alkalinity of the intestinal contents following achlorhydria favoured extremely rapid ascending invasion with *B. coli* which are found in large numbers in the duodenum. Infection with streptococci from above and *B. coli* from below, together with mechanical irritation of the mucous membranes by insufficiently-softened and broken-up food might lead to chronic enteritis which was, therefore, frequently associated with achlorhydria. Reference was also made to the presence of hæmopoietin and neuropoietin in the gastric secretions. Most people with hyperchlorhydria suffered sooner or later from gastric or duodenal ulcer, while those with [illegible] developed achlorhydria. In both [illegible] result of chronic gastritis following irritation of the mucous membranes, either mechanical irritation (bolting food, or taking excess of coarse vegetable material), or chemical irritation (alcohol, especially on an empty stomach or mixed with other irritants in cocktails; strong tea or coffee; excess of condiments; drugs such as bromides, mercury, digitalis; or tobacco).

Chronic gastritis would also follow on excretion of toxins through gastric mucous membranes after acute infections. These causes were so universal that few with the hyposthenic or hypersthenic gastric constitution escaped. Achlorhydria was often familial but it was still uncertain whether it was ever congenital. The mucous membrane attempted to protect itself by the secretion of mucus which neutralised some of the acid but also blocked the mouths of the acid-secreting tubules. The inflammation of the mucosa depressed the functional activity of its glands—the more delicate oxyntic cells suffering first. Thus, in individuals with a hyposthenic gastric constitution, achlorhydria resulted, so that removal of the mucus by lavage would restore free acid in the gastric juice. Restoration of hydrochloric acid secretion even after the injection of histamine was impossible in some cases where there was severe chronic gastritis with achlorhydria associated with secondary bacterial invasion and progressive atrophy of glands leading to achylia. In these severe cases of true achylia, the production of hæmopoietin and neuropoietin was diminished sufficiently to give rise to Addison's anæmia and subacute combined degeneration. Dr. Hurst had seen three cases in which hydrochloric acid had returned following the treatment of the gastritis. After gastro-jejunostomy for duodenal ulcer, the acidity was partially reduced by alkaline duodenal secretions. When achlorhydria was present after such operation it was generally a sign that the operation had been needlessly performed on a patient with achlorhydria, or on one with chronic gastric ulcer in which hyperchlorhydria had been replaced by hypochlorhydria as a result of chronic gastritis. Although achlorhydria made it impossible for anastomotic ulcers to form, there might be chronic diarrhœa, cholecystitis, or simple achlorhydric anæmia, while a deficiency of hæmopoietin would allow development of Addison's anæmia. The complete achylia following removal of the entire stomach might lead to the onset of this anæmia owing to the loss of the glands producing hæmopoietin. Partial gastrectomy, however, might also be followed by simple achlorhydric anæmia.

Achlorhydria was present in some 65 per cent. of patients with cancer of the stomach. The achlorhydria was caused by chronic gastritis, and the growth was a result of malignant degeneration of the chronically inflamed mucous membrane. Carcinoma of the stomach might be seen associated with simple anæmia, Addison's anæmia, and subacute combined degeneration, which also were associated with chronic achlorhydric gastritis. Dr. Hurst had seen five such cases and John Wilkinson had recorded 22 others. He believed that with the prevention of recurrences of pernicious anæmia by modern treatment an increasing number of these cases would develop cancer. Cancer never developed in a healthy stomach, but in 25 per cent. of cases followed simple ulcer, and in 75 per cent. of cases followed chronically inflamed mucous membranes. It should be possible to prevent the development of cancer of the stomach by preventing chronic gastric ulcer and chronic gastritis, or recognising and overcoming them at an early stage. Gastritis should always be treated, and treatment would bring about the return of secretion of acid in 80 per cent. of these cases. Infection of teeth, tonsils and sinuses must be overcome; milky feeds were advisable at the beginning of treatment with omission of alcohol and tobacco, followed late[illegible] diet. Stomach lavage should be [illegible] no more mucus came away; thereafter less frequently. Hydrochloric acid and pepsin should be given to those in whom achlorhydria persisted. The disappearance of gastric cancer would depend upon the prevention [illegible] gastritis.

DISCUSSION

Dr. K. SIMPSON (London) consi[illegible] certain fallacies associated with gastric histology, holding that it was impossible to estimate secretory function from a histological examination of post-mortem material. The character of the mucus secreted was important, only certain forms being capable of neutralising hydrochloric acid. Gastritis of the recoverable type was of a more superficial character; when it extended to the deeper parts of the mucosa recovery was not to be expected.

Dr. JOHN F. WILKINSON (Manchester) referred to the effect of histamine in stimulating the production of free acid in the gastric juice in cases of apparent achlorhydria; for that reason its use was often of value for the detection of true achlorhydria, the pure gastric secretion removed at ten-minute intervals being examined before and after the injection of histamine. He did not agree with the suggestion that histamine stimulated only free acid secretion and had little influence on the enzymes secretion, for the output of the latter was also increased along with the acid. The gastric enzymes played a greater part than did the acid in the prevention of certain diseases, particularly hæmopoietin (the anti-anæmic enzyme) and pepsin. True achlorhydria was most commonly associated with pernicious anæmia and gastric carcinoma, but it was also frequently found in many other conditions. There was considerable evidence that it was not only familial, but might be unassociated with signs or symptoms.

Achlorhydria was frequently associated with symptoms referable to the gastro-intestinal tract; thus flatulence might be present for years, vomiting was uncommon, and nausea and heartburn might be troublesome. Chronic diarrhœa might be associated with flatulent dyspepsia or even epigastric pain. In a series of 135 cases suffering from chronic diarrhœa 43 (32 per cent.) had achlorhydria and 41 (30 per cent.) hypoacidity, making a total of 62 per cent. with secretory dysfunction. The cause of the diarrhœa in these cases was uncertain, but the immediate improvement following the administration of hydrochloric acid was very striking. Soreness of the tongue, often with ulceration, was commonly associated with anacidity, but a few cases might show hyperacidity. In a group of 47 cases 12 (25·5 per cent.) had achlorhydria and 17 (36·2 per cent.) hypoacidity—showing gastric dysfunction in 62 per cent. of the cases. The importance of treating these cases of achlorhydria must not be neglected, said Dr. Wilkinson, since he had seen gastric carcinoma or pernicious anæmia occasionally develop in them; an examination of the case histories in pernicious anæmia often disclosed that the first symptom had been sore tongue or diarrhœa. In pernicious anæmia, achylia was practically essential for correct diagnosis, and it had been almost invariably present in his series of 554 cases. Occasionally cases resembling pernicious anæmia had been seen with free acid in the gastric juice. Many of these were "hæmolytic anæmias" of pregnancy (with good prognosis). Others presented difficulties, and were undoubtedly hæmolytic anæmias quite distinct from pernicious anæmia; in these repeated blood transfusions formed the best measure but was only of a temporary value, for the prognosis was poor. The extreme rarity of pernicious anæmia (or subacute combined degeneration of the cord without anæmia) in the presence of free hydrochloric acid in the gastric juice called into question the correctness of the diagnosis in these cases. Recent work had shown that hæmopoietin was a more important constituent of gastric juice than free acid or pepsin. Hæmopoietin was present in normal gastric juice and normal human and animal mucosa; it was absent from the gastric juice and mucous membrane in pernicious anæmia and subacute combined cord degeneration. Interaction of hæmopoietin and the extrinsic food factor furnished the liver anti-anæmic principle which was present in normal liver but absent from the liver of relapsing pernicious anæmia. Achylia always preceded the onset of pernicious anæmia, and the latter followed the complete destruction of the gastric mucosa, either by chemical agents, gastrectomy, or gastroenterostomy.

He had records of 160 families containing two or more members with pernicious anæmia, nearly 70 families showing pernicious anæmia and achlorhydria in different members, and a further 30 families showing familial achlorhydria without anæmia. He discussed the association of achlorhydria and microcytic anæmia, referring to the close relationship between microcytic and macrocytic anæmias with achlorhydria and the conversion of one into the other. These changes were particularly liable to take place after gastric operation, for the hæmopoietic system being unstable reacted excessively to anti-anæmic treatment. He indicated the very marked familial tendency in microcytic anæmia, and also drew attention to the occurrence of pernicious anæmia when chronic intestinal obstruction was associated with achlorhydria. In 554 cases of pernicious anæmia two had developed gastric cancer and two carcinomata of the colon.

Dr. C. C. **Ungley** (Newcastle-on-Tyne) said that yeast owed its effect in pernicious anæmia to the extrinsic factor (Castle). Some cases of histamine-refactory achlorhydria with pernicious anæmia retained to a variable extent their ability to secrete intrinsic factor; thus a hæmopoietic response to yeast was an indication of this functional ability on the part of the stomach. The evidence pointing to a separate neuropoietic substance was based upon (i) the lack of parallelism in incidence, course, and response to treatment between the anæmia and subacute combined cord degeneration; (ii) the rarity of this neurological condition in tropical pernicious anæmia where factors other than gastric defect played a large part; such cases often had free acid which was almost never found in true subacute combined degeneration; (iii) the high incidence of nerve involvement in pernicious anæmia associated with extensive gastric lesions; in nine cases of polyposis there were six with pernicious anæmia, four having neurological symptoms; (iv) the dietaries of cases of pernicious anæmia with and without subacute combined degeneration failed to show extrinsic differences in the two groups, and, judged by the yeast response, intrinsic differences (hæmopoietin, chlorides, pepsin) in the gastric secretory functions.

Some cases of nutritional (idiopathic) hypochromic anæmia with achlorhydria showed moderate pepsin values, and about half could secrete neutral red in the gastric juice; in many the ability to secrete pepsin, chlorides, and neutral red resembled that in pernicious anæmia. The lack of the substance produced by the action of gastric juice on meat, spinach, and yeast might cause defective absorption of food iron, and symptoms such as sore tongue, dysphagia, koilonychia, easy bruising.

Dr. J. H. **Anderson** (Ruthin) referred to the association of achlorhydria with large numbers of diseases, and said that it was important not to think of this condition only in terms of cancer of the stomach or pernicious anæmia. He had seen 20 cases of complete achlorhydria in a consecutive series of 225 fractional test-meals. The achlorhydria occurred equally in both sexes, the majority in early middle life. More than half the patients were abstainers from alcohol and tobacco, or used these drugs sparingly. The most prominent symptom could not be correlated directly with the stomach, although 17 had some digestive disability of which flatulence, lack of appetite, and nausea supplied more than half. The illnesses had varied in duration from 6 months to 36 years, and in half the cases childhood and adolescence had not been healthy. Chronic infections were frequent, but in only two did an acute infection usher in the present bad health. The diagnosis on which treatment was based did not in many cases bear directly on the stomach. Glossitis was rare, the blood picture was often normal, or showed a simple secondary anæmia, and except in a few cases the rate of emptying of the stomach was unaltered. Constipation was a usual feature, and two of the three cases of diarrhœa could be explained by other than gastric causes.

He considered that gastritis could be recognised by careful radiography with the aid of good profile and strial pictures. It was present in 11 out of 14 cases. Further research was necessary into the incidence of achlorhydria in a large number of healthy young people with adequate controls with a follow-up of their medical histories for at least a generation.

Dr. **Gillespie** referred to the antiseptic action of the stomach secretions, and said that in China he had found it particularly useful to give hydrochloric acid as a prophylactic during epidemics of cholera.

Dr. G. W. **Goodhart** (London) said it was important to remember that the stomach possessed a muscular wall in addition to a mucous membrane, and that the character of the stomach contents would vary with the rate and quality of the gastric secretion, the addition of food, the rate of emptying, and the degree of regurgitation. He did not think that Dr. Hurst was consistent when he considered that mucus was a sign of gastritis, but did not indicate an inflammatory condition of the colon; gastric lavage was really a method of resting the stomach, and thus enabled it to regain its normal functions. In the majority of cases in which gastro-enterostomy was carried out a previously good secretion of hydrochloric acid was followed by achlorhydria; when the acid returned at a later date in some of these cases the symptoms also returned. Dr. Goodhart quite agreed that there were two forms of mucus, but did not think that they could be distinguished at the present time. It appeared possible that these were secreted in different parts of the stomach. No amount of mucus would neutralise the acid in a freely-secreting hyperacidic stomach. He could not believe that mucus prevented acid secretion by blocking the ducts, otherwise what would happen to the strong acid thus held back? He thought the best way of investigating gastric secretory function was to give the ordinary gruel test-meal followed at the end of one hour by histamine, so as to get some idea of the motor functions of the stomach. He also commented upon the difficulty of reporting cases of anæmia adequately in the medical journals.

Dr. **Alison Macbeth** (London) asked whether there was any evidence for the existence of neuropoietin in addition to hæmopoietin, and considered that it might only be a difference of individual susceptibility to one and the same deficiency. She also wished to know whether there was any evidence as to the nature of the substance in yeast described by Dr. Ungley.

Dr. **Dorothy Hare** (London) asked whether any value could be attached to estimations of the volume of gastric juice secreted after histamine in differentiating achlorhydria and achylia.

REPLY

Dr. **Hurst** (replying) said that mucus in the stools showed not colitis but a normal response to irritation by hard fæces; on the other hand, a test-meal was not an irritant, therefore mucus in the stomach meant gastritis and was pathological. He had some difficulty in explaining how the mucus caused a diminution of acid secretion, but it must act chemically or mechanically—the acid was produced under very low pressure so that blockage of the tubules would readily prevent its production. He could not believe that regurgitation had anything to do with achlorhydria. Flatulence was a genuine symptom of achlorhydria, the latter being the commonest cause of chronic diarrhœa. He agreed with Dr. Wilkinson that diarrhœa and sore tongue were extremely important symptoms requiring serious attention.

Dr. **Ungley** did not think that the yeast principle was similar to the liver principle since it differed slightly in its clinical behaviour.

Dr. **Wilkinson** agreed that the fractional gruel test-meal was the most useful clinically but histamine was often of great value. It was not possible to differentiate between achlorhydria and achylia from the ten-minute volume of the secretion. Hypo-acidity was also familial, and therefore might be a precursor of achlorhydria.

SECTION OF SURGERY

Mr. **Grey Turner** (Newcastle-upon-Tyne) presided, when Mr. G. **Gordon Taylor** (London) opened a discussion on

Bad Surgical Risks

Quoting Mr. Basil Rooke's definition of a bad surgical risk as "a type of patient whose prospect of recovery from active surgical interference falls much below the average," he said the focus of the discussion was on the patient rather than on the operation; there was, therefore, no intention of discussing heroic and formidable operative procedures such as excision of the thoracic œsophagus or of large hepatic adenomata, extraction of emboli from the pulmonary artery, or such attainments as that of Pierre Duval in extracting a bullet from the pericardial portion of the inferior vena cava. He was, he said, in agreement with the accepted view that extensive operations were more than usually hazardous when performed on members of the Jewish race. He did not think it was possible for a Jew to recover from an abdomino-perineal resection of the rectum, and he considered it unusual for him to survive gastrectomy for carcinoma of the stomach. Indians he had found to be bad surgical risks; but the Chinese stood operation well, and, contrary to the accepted view, his war experience had led him to regard the Irish as good subjects for operation. A long-lived ancestry must be looked on as a great asset when surgery was contemplated. Certain operations, such as extirpation of the rectum by the combined method, were better borne by women than by men. Women, on the other hand, were more liable to anæmia following gastrectomy than were men. An important point to be borne in mind was the disastrous result that might follow the performance of a radical breast operation during the menstrual period. There was more risk attached to operations performed at the extremes of life than to those performed in the prime of life. It must be allowed, however, that operations in the first three months of life, if carried out by skilled and experienced surgeons, were characterised by a remarkable degree of safety. Rammstedt's operation for pyloric stenosis and herniotomy (when considered essential at this early age) were absolutely safe in competent hands. In emergency operations in the first few days of life, the danger was related rather to the serious nature of the condition calling for operation than to the age of the infant. The prognosis in non-gangrenous intussusception was excellent, despite its occurrence in 50 per cent. of cases between the fifth and ninth months of life. Injury and severe operation were ill-borne by the aged, but he had successfully performed colostomy for cancer of the rectum in a woman of 98 years, and he had resected under light general anæsthesia, a carnoma of the transverse colon in a man of 85, who was alive six years after.

Obesity greatly increased the mechanical difficulties of operation, both on account of the depth of the wound and because of the presence of subperitoneal fat. The likelihood of a deposit of fat around the heart must be kept in mind, and the fact that these patients were more liable to suffer from chest complications and from emboli. He thought it was wise, where there was no special urgency in the case, to spend time deliberately in reducing weight before attempting operation. A few days spent in bed were of value, and might decrease the pain experienced. Excess in alcohol and tobacco increased the risk of surgical procedures. Antecedent and intercurrent diseases were serious handicaps, especially when latent or unsuspected. He had seen pulmonary tuberculosis flare up in patients apparently recovering from perforation of a gastric ulcer. Even very definite cardiovascular degeneration did not preclude the possibility of recovery from major surgery. A low blood-pressure was a more serious handicap than was hypertension. Renal disease was a serious drawback, particularly in genito-urinary surgery. Insulin and glucose therapy had now rendered the risks of operation in diabetes almost negligible. Antecedent infections constituted a definite danger. It was known that erysipelas might recur during the convalescence of a patient who had suffered from it in the past. Recrudescence of tetanus might occur in reopening a wound infected years before; he had seen a most alarming flare up of a streptococcal infection after an operation for diaphragmatic hernia by the transthoracic route, caused by a gunshot wound ten years previously. Operation should not be undertaken in those who had recently suffered from colds, influenza or pneumonia; it was wise to allow months to elapse.

The "psychological undesirables" presented much anxiety. He would advise surgeons to avoid, if possible, operation on patients who needed persuasion and over-persuasion, and to view with alarm the sight of stacks of books at each side of the bed, more particularly if they were French novels. Other danger signals were the reading of the paper upside down, and delaying the theatre in order to put the last few lines to an autobiography. Patients, usually women, who changed their religion the night before an operation usually died. Loquacity often heralded surgical disaster.

Surgical risks were at a minimum in operations on the pelvis, which might almost be said to be the surgeon's playground. The surgery of thyro-toxicosis was at one time one of the most dangerous of fields; the work of physician and biochemist had now rendered it one of the safest. At the Middlesex Hospital the mortality rate for all cases of toxic goitre operated on by all the surgeons was under 1 per cent. Preoperative administration of iodine and repeated investigation of the basal metabolic rate had reduced the surgeon to a mere carpenter in the hands of the physician and biochemist, who seemed to know the exact hour at which operation would be best tolerated. In the field of gastric surgery a great deal of judgment was needed, there was danger of too much being attempted in a patient who would not stand it. Bleeding from a chronic ulcer at once converted a patient into a bad surgical risk, but he was, if anything, a worse medical risk, and after a second hæmorrhage the mortality without operation was about 78 per cent. The operative mortality, after a single hæmorrhage, in his own cases was 19 per cent. All gastric cancers were bad risks; whereas a patient who had had a gastrectomy done for ulcer would always try to live, if it had been done for cancer he would always die if he could. Almost every case required a transfusion of blood. The danger of post-operative thrombosis was increased when there was a high initial blood-platelet count. To minimise the danger of resections of the colon in difficult cases, and in patients who were considered bad risks, the Paul-Mikulicz type of operation should be employed more often. In his hands it carried a mortality of only 1–2 per cent. Drainage of the bowel, preliminary or simultaneous, the use of lateral incisions directly over the growth, and drainage of the abdomen at the site of the anastomosis also made for safety. In cancer of the tongue or mouth radium therapy now provided an alternative to operation.

In conclusion Mr. Gordon Taylor expressed his opinion that the development of the craftsmanship of surgery was not yet finished, and that bad risks of to-day might well become the certainties of to-morrow.

Mr. ERNEST MILES (London) said that with few exceptions the minor operations on the rectum carried no risk. But in operations for piles there was risk when excessive bleeding had led to progressive anæmia; in the patient with cirrhosis of the liver, when "stopping the leak" might lead to post-operative hæmorrhage, and where bleeding from piles was a symptom of high blood-pressure apoplexy might result from stopping it. In operating for fistula it had to be remembered that in 14 per cent. of cases the origin was tuberculous and repair might not occur. The apparently very severe operation of rectosigmoidostomy for complete anal prolapse rather surprisingly showed no mortality and was followed by perfect healing. Cancer of the rectum he regarded as "public enemy No. 1." Since without operation the condition was always fatal in two to four years, operation had to be attempted and the surgeon must put up with the material supplied to him. In the days of inhalation anæsthesia he had been wont to regard the patient over sixty as a poor risk. The fat patient was always a great problem, but the worst risk was the patient who had suffered from prolonged and severe constipation in the presence of a foul and necrotic ulcer, and had a marked degree of toxæmia. At least a week's preparation was then essential, consisting of daily enemeta, and repeated wash-outs. Where there was definite obstruction at the rectosigmoidal junction it was wise to do a cæcostomy (his own choice) or a colostomy in continuity, without division of the bowel, as a prelininary procedure.

Mr. ERNEST FINCH (Sheffield) said that to the question what was meant by "poor resistance" there was at present no satisfactory answer; he felt confident it was only a matter of time until physiology supplied one. One of the most important factors, he thought, was fluid circulation in the body. As pointing to danger in delay, he cited visible peristalsis in the case of pyloric stenosis, and dribbling urine in enlargement of the prostate. He had been particularly struck with the high mortality attaching to operations for empyema. As regards patients with cardiac lesions, it should be realised that, whatever else surgery might be responsible for, it did not cause decompensation. There was as yet no real test of liver efficiency, and we still met with unexpected fourth and fifth day deaths from failure of liver function. He looked on prostatic cases as amongst the worst risks; in Sheffield practically all the cases reached the hospital in the stage of acute retention. The catheter he regarded as the curse of prostatectomy. He pointed out that although hæmorrhage from a gastric ulcer was an indication for operation, this was not the same thing as saying that hæmatemesis was an indication for operation. He considered blood transfusion more valuable as a pre-operative than as a post-operative measure. He strongly advocated the Paul-Mikulicz type of operation in cancer of the colon in certain difficult cases; it was better, in the words of Frank Jeans, to have "a living problem than a dead certainty."

Mr. MAX DANZIS (Newark, N.J.), from his experience in a hospital in which 60 per cent. of the patients were Jews, was convinced that no greater risks were encountered in operating on Jews than on the rest of the population.

Mr. MCADAM ECCLES (London) thought it was probably the Continental Jew who constituted such a particularly bad risk. The English Jew, possibly because he was not under fear, was a better subject for operation. A preceding bout of insomnia in a patient normally accustomed to long hours of sleep formed a particularly unfavourable preparation for surgical procedures. He had also noticed that bad sailors, and bad travellers in general, took anæsthetics badly.

Dr. BERGSTROM (Sweden) said he considered one of the most important points was not to be in a hurry to operate. The heart should be treated if necessary, and time taken to X ray the lungs and test the kidney function. In prostatectomy he employed catheter drainage, was careful to ensure adequate hæmostasis and used a very large tube. In gall-bladder cases which had to be opened when they were acutely ill he employed regional and intercostal anæsthesia only.

Mr. JAMES RUSSELL (Glasgow) said he regarded as dangerous adrenaline in conjunction with local anæsthetics. It was wise to pay attention to the judgment of the ward sister in deciding when a patient was ready for operation.

Mr. E. W. G. MASTERMAN (London), from experience in Palestine, said there was no doubt that the Eastern Jew was a much worse subject for operation than was the Arab. He had operated on a girl with diabetes, under treatment and free from glycosuria. The appendix had been removed under cocaine anæsthesia, with the result that after 48 hours she had gone into a fatal coma.

Mr. R. L. SPITTEL (Colombo) said that from his experience of Indians the normal individual in his normal environment, if well-fed, constituted no worse risk for operation than members of other races.

Mr. R. B. BLAIR (Hull) thought the nervous patient was often a most satisfactory person on whom to operate, once his confidence had been obtained.

Dr. W. N. LEAK (Winsford) had come to the conclusion that the condition of surgical shock was an avitaminatosis due to failure in storage of vitamin A in the liver. He had obtained encouraging results by injecting this vitamin in post-operative cases.

Mr. BASIL ROOK (Bournemouth) said he was impressed with the psychological factor. The Norfolk labourer did not seem to suffer from shock. The person of high mentality was a worse risk than the person of low mentality. He had found the professional man, even when in the prime of life, a bad patient, because he worried about his work. The fat cheerful type of patient reacted favourably to operation.

Mr. GORDON TAYLOR, in reply, agreed with Mr. Miles about the value of preliminary cæcostomy. One of the most valuable aids to the surgeon was the coöperation of the anæsthetist.

SECTION OF NEUROLOGY, PSYCHOLOGICAL MEDICINE, AND MENTAL DISEASES

Dr. LIONEL A. WEATHERLY (Bournemouth) presided over this section and asked speakers to confine themselves to the use of hypnotics, for their abuse did not imply any inherent fault in the drugs themselves.

A discussion was then opened by Lord HORDER on the

Use of Narcotics in the Treatment of Nervous and Mental Patients

Lord Horder said that it was convenient to make a distinction between pain killers and sleep producers. The two groups overlapped; all narcotics were also hypnotics, but all hypnotics were not necessarily narcotics. If the cause of sleeplessness was pain then even mild doses of narcotics, by allaying pain, might induce sleep indirectly rather than directly. The key to the successful treatment of insomnia, he said, was to find its cause or causes. Psychical causes had been called "primary"; these included anxiety (i.e., mental pain) in various forms, especially anxiety about not sleeping; and also the emotions of joy, sorrow, fear, love, anger, remorse. These required psychological treatment. The attitude of the patient towards sleep was extremely important, especially the fear lest want of sleep should cause permanent harm. Most people slept more than was necessary, and this should be made clear in reassuring the patient. Over-stimulation of the mind might be a cause of insomnia. It was necessary to inquire as to the manner in which the patient spent the latter part of the day. Over-fatigue of the body generally might be another factor. Dyspepsia in various forms, fever, usually associated with toxæmia, circulatory and respiratory lesions, the psychoses, excited and depressive states, all these, either separately or in combination might be the causes of sleeplessness. In regard to remedies, it was advisable first of all to consider all possible general measures. The next line of approach was by way of drugs; alkalis, salicylates and aspirin, the bromides, valerian, pyramidon. The place of alcohol as a hypnotic must also be considered, and its obvious risks taken into account. A night-cap at bed time was often helpful. Opium and its derivatives were indicated in certain cases where sleeplessness was due to severe pain. Hyoscine and the older hypnotics had long been used for the relief of insomnia and to allay mental excitement. The newer group of hypnotics—the barbiturates—marked a great advance because of exactness of dosage and constancy of effect. The ideal hypnotic, unfortunately, did not exist. It was not the drug but the development of a drug-habit that called for condemnation. This was equally applicable to tobacco and to alcohol, to tea and to cocaine. Sedative drugs formed a means of escape from life and its troubles. Sleep itself was a form of escape from life. Lord Horder urged the necessity of adopting a scheme of dosage for each patient. Sedatives were not necessarily best taken at bed-time. He was convinced that the ill effects attributed to hypnotics were considerably exaggerated.

DISCUSSION

Dr. R. CUNYNGHAM BROWN stated that he had helped in working out the results of an inquiry, which the Board of Control for some years sent out to the medical officers in charge of mental hospitals as to the amount and kind of sedatives used and their equency of administration. The Board reported at there was a great variation in the kind and mount of sedatives used, and that it seemed clear at the order and tranquillity of mental hospitals ad little relation to the extent to which sedatives ere used. A further report was still in preparation. His own views on the employment of sedative drugs vas that they had a valuable place in treating mental atients to relieve feelings of anxiety and distress; o alleviate excitement; to reduce violence; and, comparatively infrequently, as pure hypnotics. Insomnia per se seldom arose in mental hospitals or among psycho-neurotics.

Dr. JAMES COLLIER (London) confined his remarks to the actual effect on the nervous system of the barbiturates, which he describes as most valuable remedies. They tended to concentrate in the cerebro-spinal fluid and thus acted specially upon the nervous system. Removal of cerebro-spinal fluid most effectively relieved cases of barbiturate poisoning. Their earliest and chief effect was upon oculomotor mechanisms in the mid-brain and upon the region of the third ventricle, including the sleep region, and the temperature regulating mechanism, and upon the red nucleus which was really a part of the cerebellum. In some cases poisoning occurred without over dosage, probably due to abnormal retention; symptoms might suggest tumour of the quadrigeminal region. He considered the barbiturates safe and valuable drugs and had not found any ill results from controlled medicinal administration. They might, however, be very dangerous where vitality was low and oxidation processes slow, and would therefore be absolutely contra-indicated in pneumonia.

Dr. HAROLD SIMMONS (Bournemouth) stated that from the point of view of general practice, the relief of immediate symptoms was a preliminary necessity. Hypnotics were therefore often necessary as a first-aid measure. The need for hypnotics ranged from immediate relief of asthma by ephedrine or aspirin to the relief of mental fatigue, mental distress and insomnia which formed a large part of general practice; they were needed for the treatment of physical pain and for the production of basal narcosis. For nerve-racked patients he used bromide combined with some tasteless form of valerian, often replaced by small doses of luminal or chloralamide. In most cases, however, barbiturate was usually necessary to produce sleep. It must be realised that to rely upon hypnotics without seeking out and treating the condition underlying the demand for them was asking for trouble. The doctor's place as confidant often enabled great psychological help to be given by a general practitioner. In 35 years' experience, Dr. Simmons had never seen a case of habitual addiction following the use of barbiturates. Recently he had cured a case of persistent hiccough of cardiac origin by a combination of belladonna and phenobarbitual known as Belladenal.

Dr. MARGARET VIVIAN (Bournemouth) stated that her experiences in her own nursing home for mental patients was that narcotics should be regarded as emergency measures and not as remedies likely to lead to cure. Of all forms of restraint drug restraint was the least desirable. Administration of narcotics over a long period was a confession of failure to discover the cause of the symptoms demanding such treatment. Patients suffering from serious insomnia were never easy to deal with. Drug addicts suffering from withdrawal symptons were also a very grave problem. Dr. Modinos, the physician in charge of the European hospital in Alexandria, had been treating many cases of rheumatism by auto-sero-therapy—i.e., he blistered the patient and re-injected the blister fluid. One day a patient who wished to be treated for rheumatism proved to be a cocaine addict, and to the doctor's surprise, he found that after three injections of the blister fluid, the patient neither needed nor desired the drug. There were many drug addicts in Egypt, and Dr. Modinos decided to try his blister fluid on all those who sought his help. In a communication to the Paris Academy of Medicine he had described the treatment of eight typical cases, including patients addicted to morphine, heroin, cocaine and hashish. From two to five injections of the blister fluid sufficed to cure them all of any need or desire for their drugs. The word "cured" meant that the patient no longer needed or desired his drug. If he relapsed, he did so deliberately and no power on earth would prevent that type of fool from reverting to his folly. So far, she had tried this method on only one case, but the result was astonishing. The patient was a doctor, who had been taking up to 3½ grs. of morphia for nearly three years. He was anxious to be cured, but had failed to cure himself. After the first blister fluid injection, his daily dose was comfortably reduced to 1 gr. in the 24 hours. The second injection produced the most surprising result, the morphine being discontinued without any of the usual distressing withdrawal symptoms. A third injection, as Dr. Modinos usually gave, had caused mild protein shock, which hindered complete recovery, but the patient was able to go home at the end of the third week, and he assured her that he had no craving for morphia.

Dr. EDGAR MARTIN (Salisbury) said that although narcotics multiplied, sufferers from mental illness, like the toll of the road, went on increasing. It was not the drug that was to be blamed, but the use made of it. Each patient must be considered individually and the narcotics carefully chosen to suit individual needs. Doctors should not permit themselves to be dominated by outworn opinions and customs, but should have the courage of their convictions and experience.

Dr. R. EAGER (Exminster Mental Hospital, Devon) spoke of the lack of available guidance in the use of narcotics and the tendency to their indiscriminate use. Paraldehyde, for example, was given in mental hospitals in this country, because it was regarded as safe and not habit forming; its excretion through the lungs, however, made it a dangerous irritant of the mucous membrane. It was given far too often without respect to the individual. The use of alcohol as a nightcap was, as Lord Horder had said, of considerable value. Dr. Eager discussed the uses of various other narcotics in some detail, but in conclusion stressed the importantce of seeking the cause of symptoms rather than resorting to hypnotics. Attention to general health and the way in which the day was spent, and the wise use of occupation therapy, which was greatly encouraged in his own hospital, should go far to remove the necessity for the use of narcotics for mental patients.

Sir ROBERT ARMSTRONG JONES (London) spoke of the essential need for sleep and stressed the danger of noise to the nervous system.

Dr. T. A. WILLIAMS (Bordighera) referred to Pavlov's definition of sleep as an inhibition. It was a form of escape from metabolic tension which otherwise would lead to exhaustion. It was important to remember this when dealing with cases of insomnia. He stressed the psychological factor, especially anxiety as a cause of sleeplessness.

Dr. AGNES SAVILL (London) referred to treatment by the constant current which was started by Dr. Leduc. She had found it of great value in cases of mental strain and fatigue resulting from mental work. She thought that the use of music as a sedative had not been sufficiently considered.

Prof. W. S. DAWSON (*Australia*) spoke of the value of sedatives in the treatment of nervous children, especially by small doses of bromide and the barbiturates. He stressed the importance of a full inquiry into all the circumstances of the child's life. Psychological difficulties could not be cured by drugs alone. He spoke of the experiment in the treatment of dementia præcox by prolonged narcosis with somniphaine, which he had carried out with Dr. Mary Barkas at the Maudesley Hospital; the results had been very disappointing.

Dr. EDWARD MAPOTHER (London) said that he had tried morphia on depressed and melancholic patients with unsatisfactory results. He said that somniphaine was useful on account of its persistent effects, but that it had considerable danger when used to produce twilight sleep.

Dr. DORIS ODLUM spoke of the value of ammoniated tincture of valerian as an adjuvant to bromide, especially in the treatment of the psycho-neuroses. She had found that the ordinary B.P. drug was more effective than the proprietary odourless preparations.

REPLY

Lord HORDER, in summing up, agreed that the adolescent was better for too much sleep rather than too little, but after the age of 20, over-sleeping was nothing but a bad habit and represented an attempt to escape from the realities of life; it should be resisted strenuously. Daylight saving ought not to interfere with the sleep of children merely from the point of view of going to bed by daylight. Darkness ought not to be essential to sleep. In regard to Leduc's treatment by the galvanic current, he thought the effects might be largely attributed to suggestion, but if it succeeded in soothing the patients, it was by no means to be despised on this account. He agreed as to the value of valerian.

NOTES FROM INDIA

(FROM OUR OWN CORRESPONDENT)

THE INDIAN MEDICAL COUNCIL

THE Medical Council for India is now a *fait accompli*. The Act which brought it into being was passed through the Assembly only with difficulty and in the face of much unofficial opposition. It was hard to see what particular features of the Act were distasteful to the medico-political "left wing," but in these days anything that has official backing is accordingly suspect. The catch phrase used by the critics of the Act was "the dictation of the General Medical Council" or, alternatively, "of the British Medical Association" (they appeared to consider them synonymous). The Council is not a "packed" official body, but at the same time sufficiently responsible, we should imagine, to satisfy the General Medical Council whose "dictation" amounts to the suggestion that there shall be some central body in India with which they can deal and which, amongst other things, will be responsible for maintaining the standard of the examinations for the degrees that they, the General Medical Council, are asked to register in England.

The Council held one meeting early in the year, and another in June, and have now elected their inspectors of examinations, Dr. Farquhar Macrae, Sir Kedar Nath Das, and Dr. R. S. Tirodkar. A somewhat inauspicious incident marked the opening meetings. At the first meeting, apparently through a misapprehension as to the significance of the decision, it was agreed that members of the Council should not be eligible for election as inspectors of examinations and that this should apply to the secretary also. As the secretary was particularly chosen for his experience in inspecting examinations which no one else in India has had, the decision was very unfortunate; the subject was, therefore, reopened at the next meeting, and the decision, in so far as the secretary was concerned, was reversed. It seems a pity that the Government representatives on the Council, who were apparently able to carry their motion at the second meeting, did not take more trouble to do so at the first and thereby obviate a charge of irregular procedure.

EPIDEMICS AND INOCULATIONS

Cerebro-spinal fever appears to be getting a firm footing in India. Small outbreaks have been reported in jails and other institutions during the last few years, but this year minor epidemics of the disease in Bombay and Delhi have attracted a good deal of public notice. In Calcutta a steady incidence of about a hundred cases a month for over a year has apparently not stirred either the authorities or the public. Admittedly most of these have been sporadic cases, and it has not been possible to trace any focus of the disease. The central research institute at Kasauli have now prepared a serum from local strains and are issuing it for trial in hospitals in various towns in India. Practically all the provinces of India have now decentralised their anti-rabic treatment. Bengal was one of the last to fall into line. An interesting result has been a falling-off in the treatments given; this suggests that a number of patients came for treatment for the sake of the joy ride to Calcutta; for not only did they get a pass on the railways for themselves and their attendants but they also got a subsistence allowance in Calcutta. Cholera has been comparatively quiescent in India for some years, but this year it is showing signs of increasing in a number of places. Lucknow has recently been "in the news" on this account, the United Provinces reporting a thousand deaths a week from this disease. The health authorities are carrying out an extensive inoculation campaign. Now news comes of a sharp outbreak in the Simla Hills, following the return of a pilgrim from Hardwar to his native village; prompt action by the Punjab health department appears to have resulted in an early control of this epidemic.

MALARIA IN MONKEYS

The chance discovery, in the kala-azar research department of the Calcutta School of Tropical Medicine two years ago, of a scanty plasmodium infection in a *Silenus irus* monkey and its passage to a monkey of another species, *S. rhesus*, which then developed a fulminant and fatal infection, has led to an enormous amount of experimental work with monkey plasmodia, not only in India, but in Europe and America. In two recent papers in the *Indian Medical Gazette* the relative effects of quinine and Atebrin, administered by different routes, on monkey plasmodial infections have been shown. The action of quinine is slower than that of atebrin—this is demonstrated very dramatically in four photomicrographs—but with the latter drug the parasites reappear after about fifteen days, whereas with quinine, though a low grade of infection usually persists for some months, it seldom reaches the clinical level, and eventually without any further treatment it appears to die out. Another interesting point is that in the case of relapse following atebrin, one dose will usually control the infection and save the monkey's life. Intramuscular injections appear to be more efficacious than intravenous.

NKS BETWEEN LONDON HOSPITALS

LAST week we published news of a closer association ween the medical schools of St. Bartholomew's, y's, and St. Thomas's. Immediately afterwards a port was issued by the London Voluntary Hospitals mmittee (L.V.H.C.) which describes other associa- ons and agreements and shows that London's hospital eds are being envisaged as a whole.

This committee, whose chairman and secretary are spectively Lord Riddell and Prof. L. S. Dudgeon, .R.C.P., has been conferring with the hospitals and edical services committee of the London County ouncil, now presided over by Mr. Somerville Hastings, .R.C.S. At a meeting on June 7th Mr. Hastings romised that the L.V.H.C. would be told at the arliest possible moment of any proposed alterations nd extensions in the Council's service which were of ufficient magnitude and importance to interest the voluntary hospitals. He also said that his committee would be glad to discuss any such alterations with the L.V.H.C. This was in response to the suggestion of Lord Riddell, who, in reference to the fact that there were 96,000 beds in question, pointed out that "certain parts of the area seem to have no hospital accommodation at all; other parts are infested by hospitals." If the council thought the accommodation in any particular district was inadequate it might be well, he said, to agree on a joint plan of action and thus avoid future friction. He on his side promised that the arrangement should be mutual—that is to say, the L.V.H.C. will notify the London County Council of any important extensions or changes proposed by the voluntary hospitals.

An example of the efforts now being made to prevent overlapping was provided by a discussion on the extension of the out-patient department and receiving accommodation at the St. Andrew's (L.C.C.) Hospital at Bow.

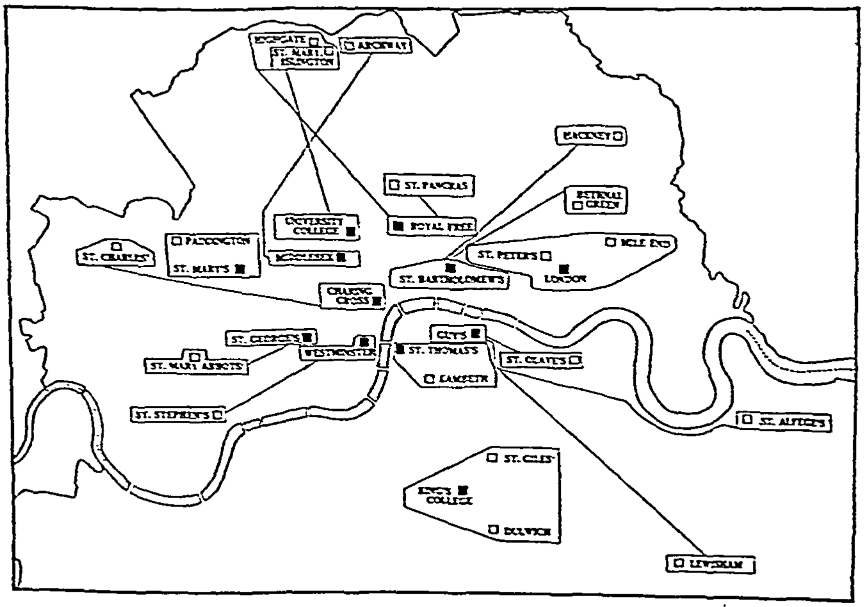
St. Andrew's is not far from the Poplar Hospital for Accidents, a voluntary hospital which has recently started to rebuild its out-patient department, and two representatives of the Poplar Hospital were present at the conference. The hospitals and medical services committee explained that there was no intention at this or any other L.C.C. hospital to provide a general out-patient department in the sense in which the term is used by voluntary hospitals, but merely to provide accommodation for the classes of cases (i.e., casualties, accidents, and other emergencies, antenatal and postnatal examination and treatment, after-care treatment for patients who had already been treated in the hospital, patients entitled to outdoor medical relief, &c., which may be admitted as out-patients to the Council's hospitals under a regulation made in 1931. The committee also pointed out that the areas from which most of the patients are drawn by the two institutions are materially different. The Poplar representatives were satisfied with this explanation and expressed their thanks to the chairman of the hospitals and medical services committee for the frank and friendly way in which they had been received.

The accompanying map shows the way in which the medical schools are now connected with municipal hospitals belonging to the L.C.C. The associations are as follows:—

Charing Cross	St. Charles'.
Guy's	Lewisham; St. Alfege's; St. Olave's.
King's College	St. Giles'; Dulwich;
London	St. Peter's; Mile End.
Middlesex	Archway.
Royal Free	Highgate: St. Mary, Islington; St. Pancras.
St. Bartholomew's	Hackney; Bethnal Green.
St. George's	St. Mary Abbot's.
St. Mary's	Paddington.
St. Thomas's	Lambeth.
University College	St. Mary, Islington.
Westminster	St. Stephen's.

As regards instruction in obstetrics special facilities have been provided by which students are allowed to reside for a fortnight at municipal hospitals, about ten cases being allotted to each of them during this period. Arrangements of this kind have been made between St. Thomas's and St. James's; the London and Mile End; St. George's and Lewisham: St. Bartholomew's and St. Giles's and St. Andrew's. It is hoped that facilities for this class of teaching will be extended.

Finally, mention must be made of the proposal to establish if possible a strong central committee to deal with the affairs of the London voluntary hospitals. It is felt that the London Voluntary Hospitals Committee covers too much of the same ground as the London regional committee of the British Hospitals Association, and a letter has been sent to King Edward's Hospital Fund for London recommending that "the voluntary hospitals should be represented by an elected executive body to take the place of the two existing bodies, and comprising adequate medical representation." The proposed committee is to be formed "with the object of promoting the efficiency



Sketch map illustrating the linking of medical schools (black squares) with L.C.C. hospitals (white squares).

of the service rendered to the public by the voluntary hospitals."

Both the present committees are elected by the hospitals, and they have, indeed, eight members in common. The British Hospitals Association Committee, however, has no medical representatives among its 33 members; whereas the 39 members of the L.V.H.C. include 21 doctors—namely, Mr. Bright Banister, Lady Barrett, Mr. L. E. Barrington-Ward, Mr. R. Davies-Colley, Prof. Dudgeon, Dr. Geoffrey Evans, Dr. Anthony Feiling, Dr. Hope Gosse, Dr. A. M. H. Gray, Sir Henry Jackson, M.P., Mr. J. P. Lockhart-Mummery, Dr. J. M. H. MacLeod, Mr. Robert Milne, Mr. Denham Pinnock, Dr. Eric Pritchard, Dr. Harold Pritchard, Mr. Cecil Rowntree, Dr. Bellingham Smith, Mr. T. G. Stevens, Dr. Hugh Thursfield, and Dr. C. M. Wilson.

MEDICINE AND THE LAW

Cross-infection at a Hospital: Negligence Claim Fails

An interesting dispute over standards of hospital technique came before the Privy Council last week on an appeal from British Columbia (Vancouver General Hospital *v.* McDaniel). Miss McDaniel, suffering from diphtheria, entered the Vancouver Infectious Diseases Hospital, and there (it was alleged) caught small-pox. In effect, the question was whether it was negligence not to isolate small-pox patients in a separate building staffed by separate nurses. The plaintiff, on the advice of her doctor, Dr. Kennedy, became a paying patient of the hospital on Jan. 17th, 1932; she was to be attended by the hospital nurses and by Dr. Kennedy. Vancouver was then encountering a small-pox epidemic. On the 18th a small-pox patient was placed in the room next that of the plaintiff; three days later another was placed in another adjoining room; a week later a third was placed in a room almost opposite, and the next day four more were placed in other rooms on the same floor. Miss McDaniel, being thus surrounded by small-pox patients, Dr. Kennedy asked that she be moved to another floor where there were no such patients and where a different set of nurses was in charge. This was done. On Feb. 3rd she was discharged cured of diphtheria and she went home; but within ten days afterwards she was found to be suffering from small-pox, which, when she sued the hospital for negligence, the hospital's legal advisers were willing to assume had been contracted by cross-infection. She claimed damages for this illness and for the consequent disfigurement and was awarded 5000 dollars in the Supreme Court of British Columbia, the judgment being affirmed in the local Court of Appeal.

The Privy Council came to the conclusion that no negligence was established; the award has therefore been upset and the hospital's appeal has succeeded. The plaintiff had said it was negligence (*a*) to put small-pox patients so close to her on the same floor, and (*b*) to let her be attended by nurses who were also attending small-pox patients. The hospital's answer was twofold. First, it claimed that its technique had been adopted on competent medical advice. Lord Alness, delivering the judgment of the Privy Council, thought this defence had not been definitely established; it was, however, proved that the technique had, in material particulars, been endorsed by every medical witness called by the hospital. The evidence of these witnesses had been unambiguous, and it has been contradicted by no one except Dr. Kennedy. The hospital's second line of defence was that its technique was in accord with approved modern practice. This issue was to some extent covered by the same evidence. Dr. Kennedy again was the main authority adduced for the plaintiff. "In spite," he said, "of recent teachings, he preferred the old system of isolating small-pox cases in a separate building, to the new system which, in effect, substituted sterilisation for isolation." The technique of the Vancouver Hospital was proved to be in vogue throughout the rest of Canada and in the United States, and no instance was given of a hospital not following the technique preferred by Dr. Kennedy. This being the state of the evidence, the Privy Council found it hard to affirm that negligence had been proved against the hospital in respect of the technique complained of. Dr. McEachern, responsible for an annual survey of 3464 hospitals in the United States and Canada, had said that the Vancouver Hospital's system was the best known to medical science to-day. The proximity of small-pox patients to other patients in an infectious diseases hospital, he said, was quite an accepted modern procedure in the modern method of handling infectious disease; so also was the use of a common nursing staff.

"A defendant charged with negligence," observed Lord Alness, "can clear his feet if he shows he has acted in accord with general and approved practice." In their lordships' opinion the Vancouver hospital had done so by a weight of evidence not to be ignored. The judicial members of the Privy Council were offering no opinion of their own on the merits of the unit system as distinguished from the isolation system in small-pox treatment; they merely decided that, in view of the evidence, the charge of negligence failed.

Protest Meeting against Hospital Report

The Vancouver case indicates that it is reasonable to take the view of medical authorities as to the proper conduct of a hospital. The popular view is not always the same. About 1500 people attended a meeting held in the Free Trade Hall at Manchester to demand a public inquiry into the death of Mrs. Taylor who, in circumstances described in THE LANCET of July 21st, died in Crumpsall Hospital after her removal from St. Mary's Hospital, Whitchurch-street, Manchester, where she had just given birth to a child. The facts appear in the report, summarised here last week, of a committee on which expert gynæcological opinion was well represented. Speakers at the meeting complained that a committee composed entirely of men could not appreciate Mrs. Taylor's mental stress at such a time, and that a committee consisting only of medical members could not be trusted to criticise the actions of doctors. There was a complaint that the whole truth had not been told in the report, and it was declared that Mrs. Taylor died of "an overdose of red tape." A motion for a public inquiry was carried with one dissentient, against whom there was some demonstration at the close of the meeting.

MIDDLESEX HOSPITAL.—Speaking last week at a special meeting of the court of governors of this hospital, in which he reviewed the story of the rebuilding, Prince Arthur of Connaught took the opportunity of replying to suggestions that the new nurses' home had set up an "almost luxurious standard." He pointed out that the anonymous donor intended to give something in the nature of a university status to women of high degree of education and training, and to provide the finest nurses' home in the world.

PANEL AND CONTRACT PRACTICE

Mortgaging the Practice

SEVERAL times recently public attention has been drawn (see THE LANCET, 1933, ii., 1324) to the position of practitioners tied hand and foot to money-lenders who have made advances for the purchase of a practice. Some of these young doctors have signed a blank form of resignation from the medical list as a condition of obtaining a loan, which means that they may at any time be evicted upon completion of this form by the money-lenders. There are cases in which panel practitioners have surrendered their practices and the first intimation to reach the insurance committee concerned has been a notification that the mortgagees have appointed a locum tenens to carry on pending the sale of the practice. Such appointments cannot be recognised, for in the event of complaints arising it may be impossible to trace the original practitioner who is of course responsible for the conduct of the practice until his resignation has been accepted by the committee and the patients properly transferred or given the option of being transferred to some other insurance practitioner on the committee's list. This trafficking in practices is on the increase—in London alone there are more than 200 cases in which fees have been assigned—and the Insurance Acts Committee and the National Association of Insurance Committees are considering their action. It was decided in a recent case (O'Driscoll and Another v. Manchester Insurance Committee) that the remuneration to which a practitioner who is on the medical list of an insurance committee is entitled is a debt which is capable of attachment and, this being so, is a *chose in action* and capable of assignment. The London Insurance Committee suggest an emendation of the National Health Insurance Act, 1924, somewhat on the lines of Section 21 of the Act which runs:

> "Every assignment of or charge on, and every agreement to assign or charge, any benefits shall be void, and, on the bankruptcy of any person entitled to any benefit, the benefit shall not pass to any trustee or other person acting on behalf of his creditors."

This would not prevent a practitioner entering into an agreement with a corporation or company to advance money for the purchase of a practice and instructing his banker to make appropriate periodical repayment. The committee say they have no desire to interfere with legitimate arrangements for the purchase of practices, realising that in many instances practitioners cannot buy at all without borrowing, but an insurance committee should not be forced into the position of agent for either party. A resolution in the sense of the emendation mentioned above is to be tabled for the coming annual meeting of the National Association of Insurance Committees. This will make void every assignment of or charge on any sum payable by an insurance committee to a medical practitioner in respect of medical benefit except for such purposes as may be agreed between accredited representatives of the medical profession and the Minister of Health. The resolution if passed will establish the broad principle, leaving the actual drafting to specialists.

Health Propaganda

While the main function of an insurance committee is to administer medical benefit to insured persons living within its area, it is also charged with the duty of health propaganda. Many committees are not in a sufficiently strong financial position to do much of this sort, others take it up in the form of lectures on "how to keep fit." When one remembers the amount of health literature sent out by M.O.H.'s, and published in newspapers, to say nothing of lectures by numberless health societies, the question arises whether there is any need for set lectures by practitioners. Do not the young people of to-day already tend to become neurotic over every little ache or pain? And is not this one of the contributing causes of so much sick pay amongst married women? Birmingham does not think so. Last year its insurance committee decided that a series of lectures on "How to Keep Fit" should be delivered during the autumn and winter by practitioners with over a thousand insured persons on their lists who had not lectured during the last five years. Notice was to be given by an explanatory letter addressed to the insured person enclosing an invitation card and a reply-paid postcard. Twenty such lectures were given, 41,444 invitations being sent out, and 4517 persons attended—an average of 10·9 per cent. of those invited. The attendance at a particular lecture varied from 376 to 100, and the cost from £18 14*s.* to £8 16*s.* The total cost of the lectures was £274, or 1*s.* 1½*d.* per person attending. Since 1925 when these lectures began, 250 have been given at a cost of £2913; the highest attendance was 19 per cent. in the first year, and the lowest 6·5 per cent. in 1930–31. Some people would doubt whether this expenditure produces results commensurate with the money spent. It will be noted that last winter at best only one person attended out of five invited, while the cheapest lecture cost nearly £9. It might be argued that if those who took the trouble to go to the lecture really wanted to know how to keep fit they could consult their own doctor.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Capts. C. V. Griffiths to *Victory* for R.N. Hospital, Haslar, and J. G. Danson to *President* for course.

Surg. Lts. S. R. G. Pimm to *Victory* for R.N.B., and H. de B. Kempthorne to *Victory* for R.N.B.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Sub-Lts. R. J. Carr and J. D. Spillane to be Surg. Lts.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. L. G. Gibson retires on retd. pay.
Maj. J. B. A. Wigmore to be Lt.-Col.

ARMY DENTAL CORPS

Capt. J. L. Craig to be Maj.
Lt. F. J. McCarthy to be Capt.

TERRITORIAL ARMY

Lt.-Col. W. F. Denning resigns his commn. and retains his rank, with permission to wear the prescribed uniform.

General List.—Lt. D. L. Cran resigns his commn.

INDIAN MEDICAL SERVICE

Lt.-Col. A. W. Overbeck-Wright retires.

ROYAL AIR FORCE

Squadron Leader A. J. O. Wigmore is placed on the retired list on account of ill-health.

PUBLIC HEALTH

London Sewage and the River Thames

THE two most important tributaries of the River Thames are the great outfall sewers which discharge into it within a few miles of each other, at Barking on the north side and Crossness on the south. The treatment of these effluents has been the subject of a Royal Commission, and has continually occupied the attention of the Metropolitan Board of Works and its successor, the London County Council. The vastness of the problem has caused these bodies to walk warily, and, although experimental work has been undertaken on behalf of the Council by its officers, no material change in treatment has been effected since the system of sedimentation, either with or without the aid of chemical precipitants, was introduced in the last decade of the 19th century. It has however for some time been felt that further treatment of the increasing volume of effluent was necessary, and in a recent report to the Council the Fire Brigade and Main Drainage Committee note complaints about offensive smell from the river and suggest that it is the Council's duty without delay to improve things.

The activated sludge process had been tried on a small scale at the Crossness works, using a plant of rather special design in which the liquid to be treated was impelled by simple paddle wheels through long channels where its surface was exposed to the air and allowed to return through a lower channel. This was found to work extremely well and a much larger unit was authorised for the Barking outfall on similar but improved lines. After a sufficient amount of sludge had been prepared by aeration of successive volumes of settled sewage and conservation of the flocculent sediment thus produced the first large unit was put into commission in November, 1931. It was found that with volumes of sewage up to 8 million gallons a day an effluent was produced which could not possibly do any harm to the river, the maximum economy being obtained when treating 10 million gallons a day with from 7½ to 10 per cent. of activated sludge. Substantial economies have been effected by locating the re-aeration channels in a portion of the precipitation channels, thus taking advantage of existing works, and by the use of double compartment aeration channels. The Council have now decided to construct five additional units of similar capacity, which, with the existing plant, will enable rather more than one-third of the total dry-weather flow at Barking to be treated by this process. The estimated cost of the new plant, which will be spread over some years, is £520,000, apart from outlay on detritus pits and sludge digestion. The cost of running, including debt charges, is estimated at £40,000 a year, or a rate of about one-third of a penny.

These proposals, which seem to have attracted little public attention, are probably on a larger scale than anything before attempted; they are the end-result of long continued research, first on laboratory scale, through stages representing a small town and one of (say) 300,000 inhabitants. The new plant is based on the same principles as the old one-acre filter-bed at Barking which was the first attempt at biochemical treatment of sewage in this country. The essential agent being dispersed in the liquid to be treated as free humus the installation will be far more compact than one in which the agent is spread over a solid surface. The minor improvements mentioned should aid in sedimentation of the sewage before treatment by sludge, should reduce the amount of foul sludge which has to be dumped in the sea, and yield a useful source of power from the gases of fermentation. Substantial improvement may be expected in the summer condition of the Thames in the metropolitan reaches. Is it too much to hope that salmon will again consent to breed in the upper reaches?

Port Medical Service

A new edition of the "International Quarantine Directory," first issued in 1930 as the "Quarantine Annual," has just been issued by the Office International d'Hygiène Publique, and an English translation can be obtained (price £1 1*s.*) on application to the Ministry of Health. While the directory is of special interest to port sanitary authorities and port medical officers in connexion with their quarantine and other port sanitary duties, it should also appeal to shipping companies, to masters of ships and to ships' surgeons, who will find it particularly useful to have information conveniently to hand on port sanitary dues, costs of fumigation, quarantine anchorages, boarding stations, arrangements for medical treatment and on many other matters concerning the health organisation of the various ports at home and abroad.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 21ST, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0 (last week 2); scarlet fever, 2517; diphtheria, 1260; enteric fever, 38; acute pneumonia (primary or influenzal), 611; puerperal fever, 46; puerperal *pyrexia, 81; cerebro-spinal fever, 26; acute* polio-myelitis, 13; acute polio-encephalitis, 1; encephalitis lethargica, 6; dysentery, 8; ophthalmia neonatorum, 93. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 30th–31st was as follows:—Small-pox,
0; scarlet f[illegible] 49; measles, 736 (last
week 894); [illegible] peral fever, 30 mothers
(plus 8 babie[illegible] 269; poliomyelitis, 2;
"other disea[illegible] t's Hospital there were
20 babies pl[illegible] lmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (1) from enteric fever, 22 (3) from measles, 6 (1) from scarlet fever, 12 (0) from whooping-cough, 38 (3) from diphtheria, 29 (12) from diarrhœa and enteritis under two years, and 14 (3) from influenza. The figures in parentheses are those for London itself.

Of the deaths from measles 2 each were reported from Gateshead, Newcastle-on-Tyne, Birmingham, and Stoke-on-Trent. Whooping-cough proved fatal in 2 cases at Croydon, Kingston-upon-Hull, Leeds and Liverpool. Diphtheria caused 5 deaths at Leeds. Three fatal cases of diarrhœa were reported from Liverpool, no more than 2 from any other great town.

The number of stillbirths notified during the week was 241 (corresponding to a rate of 35 per 1000 total births), including 43 in London.

ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL.—The report for 1933 of this Oswestry hospital states that a beginning had been made with the scheme of reconstructing the temporary buildings, and a programme of work up to 1936 has been decided upon. During the year 1328 patients were treated—787 adults and 541 children. The daily average of 324 in-patients was larger than usual in consequence of extra provision having been made for the treatment of new cases of poliomyelitis. The average stay of each adult was 118 and of each child 105 days. The ordinary account showed a credit balance of £310, mainly due to the larger number of patients, and the increase of voluntary subscriptions.

OBITUARY

MARCUS SEYMOUR PEMBREY, F.R.S., M.D. Oxon.

LATE PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF LONDON

WE regret to announce the death of Prof. Pembrey which occurred unexpectedly at Oxford in a nursing home on Monday, July 23rd. He had recently retired from his professorship, and had arranged to continue much scientific work in his new home near Oxford.

Marcus Seymour Pembrey was the son of an adept in oriental languages connected with the Oxford Clarendon Press. He gained at Christ Church, Oxford, at an unusually early age, an exhibition in science, and graduated in arts in 1889, took the M.B., M.Ch. degrees in 1892, and proceeded to the M.D. in 1895, having secured a Radcliffe Travelling Fellowship. In accordance with the rules of this prize he conducted medical research abroad during the period of its tenure, mainly at Würzburg and Kiel, after which he returned to Oxford as demonstrator of physiology under Burdon-Sanderson and collaborated with Prof. J. S. Haldane in varied scientific research. Valuable work now began to appear from him in the columns of the *Journal of Physiology* and of the *Philosophical Magazine*, among other papers being one in coöperation with Haldane on the determination of the composition of the air, and one, in association with August Gürber, on the influence of bleeding and transfusion on the respiratory exchange. This field of physiological chemistry he continued to cultivate for a long period, writing on the reaction of mammals to changes in temperature, on the influence of bleeding upon the respiratory exchange, and upon the effects of temperature on the output of carbonic acid, and making contributions to literature along similar channels—all worth while, and none more so than his papers in the *Guy's Hospital Reports*.

PROF. PEMBREY

[Photograph by Elliott & Fry

From Oxford Pembrey went as lecturer on physiology to the Charing Cross Hospital Medical School, and had made his mark as teacher when he transferred his services to the school of Guy's Hospital. While lecturer at Guy's he wrote with Dr. C. P. F. Phillips a short manual on the physiological action of drugs. The experiments described were planned to form an introduction to the investigation of the action of medicines upon the living human subject. The modes of applying electric and thermic stimuli to the muscles were set out, and numerous tracings given showing the effects on muscular contraction and on cardiac beats under the administration of saline solutions, and solutions of alcohol, chloroform, strychnine, cocain, digitalin, suprarenal extract, and many other active principles. In 1922 Pembrey was elected F.R.S., and in the same year he collaborated with Prof. Cathcart and the late Prof. Noël Paton in a valuable treatise entitled Practical Physiology." The book was based on a previous one written by Dr. A. P. Beddard, Pembrey himself, and others, and Pembrey contributed the section on advanced experimental physiology. The work rapidly went into further editions, the excellent features of the elementary experimental course being recognised while in Pembrey's section, where the animal work naturally took a more prominent position, the application to man was never lost sight of, and the human subject was profusely used.

We have received the following from two of Prof. Pembrey's colleagues; a fine picture of him is given in their direct words. "As a physiologist Pembrey's interests were distinctly catholic. A devoted lover of nature, he gleaned a wealth of information from the events of everyday life and the texts of his discourses were frequently taken from the farm. He was an ardent "vitalist" and the phrase "all things work together for good" was his guiding principle. He revelled in the struggle for existence and constantly preached the doctrine of self-determination. His early work dealt with respiratory exchange and his measurements of the respiratory quotients of the marmot still form the basis for discussions on the interconversion of fats and carbohydrates. His investigations of the variations in body temperature led to work with the Royal Army Medical Corps upon "heat-stroke" and the equipment of the soldier, and to research into questions of temperature-regulation and sweating. The physiology of reproduction was a constant interest and he published many papers upon the fœtus and newly-born. As a teacher he was not orthodox and his remarks savoured little of the text-book. He always considered that discussion and question and answer were far more satisfactory for educational purposes than systematic lectures. To foster this principle he founded at Guy's the Students' Physiological Society, and for over thirty years it has flourished as a nursery for debate and business procedure. Profoundly impressed by the wide range of variation in the so-called "physiological constants" he continuously waged war upon the term "normal" and to him places of decimals were anathema.

"Pembrey was very happy at Guy's and did everything possible to bring together clinicians and workers in the scientific departments. From his early days at the hospital, when he investigated the physiological aspects in Cheyne-Stokes respiration with the late Sir Frederick Taylor, he was a frequent visitor to the wards, and all the original work in his laboratories was of a practical character. Nowhere can students have received greater encouragement to carry out scientific investigations, and numerous papers in the *Journal of Physiology* and the *Guy's Hospital Reports* testify to the encouragement he gave to team work in research. To his juniors, in these combined exercises, he was a constant source of stimulation, and he was most punctilious as to the even distribution of both responsibility and credit. Almost all of the physicians on the hospital staff were his demonstrators or students, and they would find it difficult to express how much they owe to his friendship and his interest in their work and careers.

"He was indefatigable in his attendance at school meetings. He was almost too fond of arguing, but the school will always be indebted to him for the soundness of his advice and his wise counsel in times of difficulty. A candid and outspoken critic, a loyal friend, his intense humanity made him the repository of the troubles of many of his students and colleagues. He never spared himself in his efforts to assist those whom he deemed worthy, and his cheery optimism helped to dispel gloom from many a difficult situation.

A. F. H.
W. R. S.

WILLIAM FOSTER CROSS, M.R.C.S. Eng.

Dr. W. F. Cross, who died in his sixty-second year on July 14th, at Falmouth, where he was living in retirement, was the son of Mr. W. H. Cross, Clerk to St. Bartholomew's Hospital from 1866 to 1905, and like his elder brother, Dr. E. W. Cross, was born and brought up within its precincts, going to school within a stone's throw—at Merchant Taylors'. Foster Cross qualified in 1896, held resident appointments at Tottenham Hospital and then returned to Bar[illegible] as senior house physician, in that capacity administ[illegible]ing as was then the custom a large number [illegible] anæsthetics. When his term of office expired he to[illegible] up anæsthetics as his career. In 1905 he succeeded Edgar Willett, and in 1916, on Richard Gill's retirement, became chief administrator. Early on he made a contribution on somnoform and was interested in new developments, but as time went on he limited himself more and more to the sequence gas-ether induction with Clover's inhaler followed by chloroform given on a piece of lint; being absolute master of this method he made it look [illegible] was a painstaking teacher, an[illegible] have cause to remember him [illegible] always courteous and good humoured and was never known to be put out even under considerable provocation. On the golf course he was a genial and friendly soul.

CORRESPONDENCE

UNEMPLOYMENT ASSISTANCE: DETERMINATION OF NEEDS

To the Editor of THE LANCET

SIR,—We understand that under the new Unemployment Act a very large number of the unemployed and their families will come to depend partly or entirely for their support upon the allowances granted by the Unemployment Assistance Board.

Our experience, as physiologists and members of the medical profession, leads us to believe that there will be grave danger of widespread physical deterioration, especially among the growing generation, if a considerable section of the population, obliged for reasons beyond its control to depend for maintenance on public funds, is unable to purchase sufficient food and other necessaries for healthy existence.

We therefore welcome the provision made in the Act that the allowance granted to an applicant "shall be determined by reference to his needs, including the needs of any members of the household . . . who are dependent upon him." The definition of "needs" is necessarily left to the Board to determine; it is stated, however, that it is the function of the Board to promote the welfare of the unemployed and "to provide for the re-establishment of such persons with a view to their being in all respects fit for entry or return to regular employment." We suggest that a standard of needs which will fulfil the intention of the Act can only properly be arrived at in consultation with medical and other expert opinion qualified to estimate the minimum requirements of healthy living and the cost of satisfying them for families of various sizes.

"Needs" are conveniently divided into (1) food, (2) rent, (3) fuel, (4) clothing, (5) light, cleansing materials, and sundries. With regard to food, scientific knowledge has now reached the point where it is possible to determine fairly accurately the minimum necessary to maintain health and working capacity. The findings of the recent joint conference representative of the British Medical Association and Ministry of Health committees on nutrition on the constituents of a physiologically desirable dietary and the work of the B.M.A. Committee on specimen minimum diets can no doubt be used as a basis for estimating the minimum expenditure necessary.

With regard to other needs further investigation might have to be undertaken before a satisfactory standardisation could be agreed upon. An adequate expenditure on food will only be secured if some margin is allowed for the small conventional necessities of civilised life.

A scientifically determined scale such as we have in mind would obviously have to be adjusted to changes in the cost of living from place to place and from time to time.

We are, sir, yours faithfully,

E. FARQUHAR BUZZARD,	G. C. M. M'GONIGLE,
STUART J. COWELL,	CHARLES MCNEIL,
J. B. S. HALDANE,	V. H. MOTTRAM,
LESLIE HARRIS,	J. B. ORR,
F. G. HOPKINS,	CHARLES PORTER
J. C. G. LEDINGHAM.	HUMPHRY ROLLESTON.

RE-EXAMINATION OF MENTAL DEFECTIVES

To the Editor of THE LANCET

SIR,—The judicial *obiter dicta* expressed in a recent case have been adequately commented upon by yourself. Towards the end of the first and second years that a patient has been under the Mental Deficiency Act of 1913 he is visited and, if found *to be still feeble-minded, he will not be officiall*[illegible] *by the Visitors for another five years, when a* [illegible] report has to be made upon his condition and [illegible] whether, if he is discharged, his further supervision and care will be adequate.

Now to make a report prognosticating a patient's state for five years would, indeed, in many cases be an impossible burden to impose upon the Visitors were it not that they are aware that the continuance of a patient under the Act can at any time be determined by others than themselves. But so far as their own powers are concerned, I believe it to be generally *deemed that the arbitrarily ordained period of five years is absurdly long. The cases with which the Visitors are concerned are unhappily for the most part of so feeble-minded a degree that neither at the end of one, two, five or any number of years, is there any likelihood of discharge from the protection of the Act; but the trial upon which you comment is an excellent illustrati*[illegible] *a great difficulty which often confronts th*[illegible]*ors and in which they feel the five-year perio*[illegible]*ous—namely, the case of the young person who* [illegible] *easily pass for normal in the class in which he or she has being, whose defect lies in an incapacity to appreciate current standards of moral conduct, whose volition is feeble and his scholastic* ntellectual capacity below the average. The young male of this character tends to become an "in and ut" delinquent and the young female a more or ess overt prostitute and the mother of babies of arious or unknown paternity. In these cases the Visitors may be in much perplexity as to whether a person of this character should be somewhere Where "Liberty" is interfered with but the means of supervision and care are adequate or in a situation of which prostitution and accidental and unintended motherhood are the likely incidents.

Whatever our views as to the conduct of the defendant in the recent case, it is at least conceivable that like offenders in like circumstances might be as much impressed with the normal appearance and conduct of the girls they have to do with as was the Judge in the case under discussion and the fact that the girl was under the Mental Deficiency Act as little reasonable and proper as it appears to have seemed to him.—I am, Sir, your obedient servant,

Harley-street, W., July 30th. E. D. MACNAMARA.

DISPLACEMENT OF THE INTERNAL EPICONDYLE INTO THE ELBOW-JOINT

To the Editor of THE LANCET

SIR,—I was much interested to read the comments of Mr. Fairbank and Mr. St.J. D. Buxton on my article. I am in complete agreement with them that the title should be reserved for the condition of subluxation with nipping of the epicondyle in the joint, and that cases of outward dislocation of the elbow with epicondylar fracture should be excluded from the category of intra-articular interposition of the epicondyle.

Their insistence on open operation, even in early cases where manipulation is possible, is prompted partly by the fear that the manipulation may damage the ulnar nerve and partly by the necessity for inspecting the damaged nerve, and, if necessary, transposing it. The latter reason is backed up by quoting the general principle that all fractures complicated by nerve injuries should be subjected to open operation. Those surgeons who follow this principle will naturally have no place for a manipulative reduction in their armamentarium. On the other hand, conservative measures in relation to closed fractures complicated by nerve lesions are very widely practised, and it is by no means generally held that such cases should be operated upon immediately. The musculo-spiral nerve, for instance, is not thus treated in closed fractures of the humerus complicated by wrist-drop.

It follows that in the type of case under discussion surgeons who do not see any necessity for immediate exploration of the ulnar nerve will rely on a manipulative reduction in those cases in which it is possible. If the nerve lesion persists an anterior transposition can be performed later and no harm has been done; if it recovers, the need for an operation has been entirely avoided with obvious benefit to the patient. The possibility of inflicting damage upon the ulnar nerve during the manipulation seems a very remote one, but until our practical experience of the method is greater the importance of this factor must necessarily be a matter of individual opinion.

Mr. Fairbank and Mr. Buxton in their letter dealt with many points in connexion with the mechanism of production, and I regret that the desire to be brief prevents me from discussing this aspect of the condition which is of very great interest to me.

I am, Sir, yours faithfully,

Liverpool, July 28th. NORMAN ROBERTS.

CALLING THE ANÆSTHETIST

To the Editor of THE LANCET

SIR,—Recently in the lay press a protest was made against the calling of an anæsthetist to give evidence at an inquest where death had occurred under an anæsthetic while an operation was being performed. The view was put forward that it is very rare for the anæsthetic to be the cause of death. This is also my experience, based on several years' post-mortems conducted on deaths occurring under anæsthetics, and during the present week I have had four such cases consecutively: three from large teaching hospitals, the fourth from a large municipal hospital, where the surgeon and anæsthetist were men of wide skill and experience. The causes of death in these cases were so unusual that I think they are worth recording.

CASE 1.—A man, aged 56, who had previously been cystoscoped, was undergoing an operation for papilloma of the bladder. A question had been raised as to whether this growth was malignant. The patient was prepared with avertin and given gas and oxygen anæsthesia. The papillomatous growth was widely excised by a diathermy knife. After 20 minutes the patient suddenly changed colour and collapsed on the table. The usual restoratives were applied without avail. The post-mortem in this case revealed an old patch of myomalacia cordis with a sclerotic right coronary artery which had been completely occluded. Death was due to coronary thrombosis in which clearly the anæsthesia played no part.

CASE 2.—A woman, aged 62, was being operated on for a carcinoma of the breast which she had had for some months, but had refrained from seeking medical advice. She was prepared in the usual way with avertin and a gas-oxygen-ether anæsthesia was used. The surgeon stated that, after making the usual incisions preparatory to amputating the breast and cutting the pectoralis major, he heard a slight hissing sound. Shortly after the patient collapsed, becoming cyanosed and, finally, respiration ceased. The usual restorative measures, including cardiac massage, were unsuccessful. In this case the post-mortem showed a carcinoma of the left breast, with a large mass of glands in the axilla and in close relation to the axillary vein. The lungs were collapsed; there were a few enlarged glands which looked malignant in the mediastinum. On opening the heart, the whole of the right side was full of froth and blood. The tricuspid valve was raised by a mixture of air and blood. The heart was in diastole. The cause of death in this case was clearly air embolism, and again the anæsthetic had nothing to do with the death.

CASE 3.—A patient, aged 28, a meat porter, was undergoing an operation for a submucous resection of the septum. He was a perfectly healthy man. The nose had been previously packed with 10 per cent. of cocaine and adrenalin. The anæsthetic used was A.C.E. administered through a Hewitt's airway. The posterior nasopharynx was carefully packed by the surgeon with a marine sponge. The operation proceeded normally, and after ten minutes or a quarter of an hour the patient became cyanosed, respiration failed, and he collapsed. Again the usual restorative measures were used without success. The post-mortem in this case revealed a perfectly healthy man. The trachea and lungs, however, were full of blood, which must have come by some means from the naso-pharynx. Death in this case was due to asphyxia from hæmorrhage into the lungs, and again the anæsthetic was not responsible.

CASE 4.—A woman, aged 40, was being operated on for exophthalmic goitre. The right lobe of the thyroid had been removed and half the left lobe. Ether and avertin was the anæsthetic employed. She was returned to the ward in fair condition, and some time afterwards respiratory embarrassment began and she was cyanosed and dyspnœic. The resident, thinking that there was some blood-clot in the wound, took out a few stitches and released a little clot. Her condition, however, did not improve, and later the surgeon returned and did a tracheotomy, having previously passed a catheter into the larynx. The patient died during the second operation, a few hours after the first, under a gas anæsthesia. In this case there was a large hæmorrhage down both scalene muscles and behind the sternum: the lungs were slightly congested. The abdomen showed advanced tuberculous peritonitis. Death in this case was due to hæmorrhage from the thyroid wound and shock, possibly accelerated by the abdominal condition. Clearly the anæsthetic here played no part in the ultimate issue.

I have stated these cases, which happen to be the last four post-mortems I have done this week, of death under anæsthetic to add strength to the contention that the anæsthetist is rarely to blame. It is also true—and we have it on the authority of Sir Thomas Lewis—that the heart is very rarely unable to stand the strain of an anæsthetic. Therefore, I would add my plea to the anæsthetist mentioned in the beginning of this letter, that no useful purpose is served by calling an anæsthetist in these cases except where there has been an obvious accident, such as the wrong joining up of a Junker apparatus. To do so frightens the public and achieves no useful object. Death, in my view, is far more likely to be due to surgical interference, and if evidence is required, then I think the surgeon and not the anæsthetist should be called. In any case, it is the surgeon who is responsible for the operation. I am, Sir, yours faithfully,

Harley-street, W., July 25th. GERALD SLOT.

PERINEO-ABDOMINAL EXCISION OF THE RECTUM

To the Editor of THE LANCET

SIR,—In reply to Mr. Gordon-Taylor it must, I feel sure, be well known that Prof. Grey Turner in 1920 described perineo-abdominal excision as a second stage operation after colostomy. Cases treated by this operation have been shown at the Royal Society of Medicine on many occasions in recent years, and Mr. Gordon-Taylor has given the support of his great experience to it. (Proc. Roy. Soc. Med., 1930.) Within the last two years I have referred with appreciation to this operation in the Index of Prognosis (4th Edition, p. 466), and in my book on rectal surgery where, after describing Prof. Grey Turner's operation, I mentioned (p. 216) two cases in which I had done perineo-abdominal excision in one stage. My recent paper is the outcome of further experience on these lines.

The majority of new operations or manœuvres are developed from already existing methods, and in the present instance I had thought that the title "perineo-abdominal excision *in one stage*" would indicate that the operation to be described was a new or different modification of the existing method. There was no intention on my part to claim originality for the title "perineo-abdominal," and I regret the omission of a reference again to Prof. Grey Turner's original two-stage operation; by doing so the evolution of the one-stage operation would have been shown more clearly, particularly to those who had not seen my previous references.

I am, Sir, yours faithfully,

Harley-street, W., July 30th. W. B. GABRIEL.

THE TREATMENT OF CORNS

To the Editor of THE LANCET

SIR,—During the recent discussion about the recognition of Chiropody at the British Medical Association meeting, it was freely accepted that corns should be cut, also that "long continued treatment" is needed for corns. It is certainly true that, if corns a treated by being cut, they must be treated for a lo time. When, however, it is realised that corns a the result of pressure due as a rule either to faul footwear or to faulty muscle balance, treatment i brief and its results are lasting. Incidentally, restoration of normal muscle balance, the use of suitable shoes, and the *eradication of corns* saves the patient from foot strain and other disabilities.

I am, Sir, yours faithfully,

JAMES K. MCCONNEL.

St. John's Wood, N.W., July 30th.

GLANDULAR FEVER AND INFECTIOUS MONONUCLEOSIS

To the Editor of THE LANCET

SIR,—In his first Lumleian lecture, appearing in your last issue, Dr. H. L. Tidy, referring to the case which I reported to the Royal Society of Medicine in 1915, kindly credits me with something which rightly *belongs to another. It* was Dr. Parkes Weber who, in the discussion that followed my paper, called attention to the similarity of my case to those published by Marchand and Cabot, and referred me to their papers. Dr. Parkes Weber's wide knowledge of medical literature has in the past so often helped me in the investigation of obscure cases that I hasten to take this opportunity of acknowledging my indebtedness to him in this instance. It may be of some general interest to add that the patient whose case was recorded in 1915 is to-day a healthy active man, who has never had a day's illness since his attack of glandular fever in 1911.

I am, Sir, *yours faithfully,*

Sheffield, July 31st. ARTHUR J. HALL.

TRAFFIC IN WOMEN IN THE EAST

A CONFERENCE on this subject was held on July 25th at the London School of Hygiene and Tropical Medicine under the auspices of the joint standing committee of the British Social Hygiene Council and the Conference of British Missionary Societies. Lord Lytton presided at one session and Sir Cecil Clementi, late Governor of the Straits Settlements, at the other. The objects of this preliminary conference were to consider means of making the conference proposed to be held by the League of Nations (probably in Singapore) effective, by increasing interest in the subject among non-official organisations in the East, so that coöperation between governments and non-official organisations in combating the traffic in women might be made easier. Support for these objects was given by the High Commissioner for India, by representatives of the Chinese and Japanese Legations, the Dutch East Indies, and the League of Nations, and by the Bishop of Singapore, prominent members of Protestant and Catholic Missions in the East, and the Salvation Army. The Colonial Office, the Home Office, and the War Office were also represented. Notice was taken of the general movement in the East, as well as in Europe, for the elimination of the tolerated brothel system, and it was stated that medical authorities had very largely ceased to believe in the effectiveness of this system in preventing disease and in assisting in the maintenance of the health of the community. Abolition of regulation and toleration and the setting up of free and efficient venereal diseases treatment centres, available for the whole community, were now believed to be the line of progress on the medical and health side, so that there was no longer any serious conflict between the moral and medical outlook.

A number of resolutions were carried strongly supporting further action by the League of Nations and by the various Eastern Governments, with a view to securing inter-governmental action, which at present, it was stated, is the main hindrance to the elimination of the traffic in women and children.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Summer Adjournment

Both Houses of Parliament adjourned on Tuesday, ly 31st, for the Summer recess. They will reas-mble on Oct. 30th, but in accordance with recent rocedure power was given to the Lord Chancellor nd the Speaker of the House of Commons to summon heir respective Houses earlier if necessity should rise.

Safety and Health in Mines

On July 17th, in Committee of Supply, Mr. E. BROWN, Secretary for Mines, said that there were now open and completed at the moment 145 pithead baths provided out of the Welfare Fund, and 25 were under construction, making a total of 170. Previous to the establishment of the Fund there were 32 other baths, so that at the moment they had 202 pithead baths either constructed or under construction, and the number of employees provided with baths was 248,332, or nearly one-third of the men on the books of the collieries. He had heard the great reform undertaken in the new regulations regarding lighting described by a prominent mining engineer as in his judgment the greatest reform for a generation.

The new Order fell into three parts. Part I., which comes into operation on Sept. 1st next, dealt with lighting by means of safety lamps; Part II. dealt with lighting by means otherwise than by safety lamps; and Part III. dealt with lighting above ground and with the very important subject of whitewashing underground. Part II. came into operation on July 1st this year, and Part III. comes into operation on Sept. 1st this year. Part I. was designed to raise the standard of lighting by means of safety lamps, and it was estimated that inside the two and a quarter years allowed for the change-over the lamps provided under the new standard would give twice as much light as the lamps now used, and 300,000 lamps would have to be replaced. As regarded Part II., in safety lamp mines the use of fixed lights provided by current from the electric mains had hitherto been restricted to areas not within 300 yards of the face. Part II. extended this lighting under special precautions to roads ventilated by intake air up to 50 yards from the working face, and in other roads up to 100 yards from the working face. Part III. provided for sufficient lighting on the surface where persons regularly worked, and underground at shaft insets and shaft sidings; while the whitewashing would take place compulsorily at important places underground such as sidings, landings, pass-bys, offtakes, and rooms containing engines, motors, and other appliances.

DEEP MINES

Mr. TINKER called attention to the extreme depth—over 4000 feet in some cases—at which miners were called upon to work and the high temperatures which they had to endure. He said he hoped that this matter would be dealt with as mines were getting deeper and deeper.

Lord BALNIEL said that infinite trouble and care had been taken in order to deal with this problem. He did not think that anything more could be done considerably to reduce the temperature. Modern science did not know the way.

Mr. DUNCAN GRAHAM urged a rigid fixed working day for miners, a maximum beyond which he should not be asked to go, and a shorter working day for the men in deep mines.

Mr. BROWN, in reply, quoted Dr. J. S. Haldane, who pointed out in a note dated November, 1933, that the Royal Commission on Health and Safety in Mines (1900) unanimously drew the conclusion that "on the whole we do not think that any good object would be served by prescribing a limit of wet bulb temperature for the carrying on of work in mines." Neither the Royal Commission of 1909, Dr. Haldane went on, nor any report of the Deep and Hot Mines Committee, has suggested any definite limitation of the depth at which coal could be worked beyond pointing out that the greater the depth the better the ventilation must be. The idea that 4000 feet would prove to be about the maximum depth at which men could work dated from a time when knowledge of the subject was still very limited.

Unemployment and Health Insurance

Mr. CLARRY said that in response to a request by certain of his constituents he begged to present a petition signed by 16,390 persons, mainly resident at Newport (Mon.), protesting against the provisions of the new Unemployment Act and the National Health Insurance (Amendment) Act, 1932. The petitioners alleged that the provisions of these Acts embodied a savage attack on the unemployed and their families, and further that they would inflict severe privations on thousands of men, women, and children, and cause disruption of family life and the pauperisation of the unemployed through circumstances over which they had no control.

Progress of Town Planning

In the House of Commons on July 26th, on a vote for the Ministry of Health, Sir P. HARRIS said that housing and town planning ought to be regarded as one problem. In Liverpool they had a complete town planning scheme, and in the County of London already there were 18 town planning schemes covering an area of something like 37½ square miles. That was all to the good. He understood that the London County Council were going to make a complete survey and a complete scheme of town planning inside their boundary. But he believed that the Minister of Health would agree that all boundaries made for town planning were more or less artificial. There was now no real division between the town and the country. In London, what made the problem so difficult was that of the increase of 920,000 persons according to the last census fewer than 500,000 was due to natural increase, or the ordinary growth of the population. The balance was made up by the migration of over 400,000 people. They were flowing into this big area unorganised, unplanned largely, and there was no authority that was big enough to apply its mind to the position except the Government, particularly the Ministry of Health, and he might add the Ministry of Transport and the Ministry of Labour. More than half of this increase of population was outside the county; inside the county the population was going down. In the greater London area there were 135 local authorities. This led to a division of responsibility in the matter of town planning which made the problem almost insoluble. The first thing to be done was to have a green girdle round London to stop the further urban development of London unless there was a reasonable provision for parks, gardens, and open spaces. He urged the Minister of Health to give a lead to the local authorities, to get them together and encourage and stimulate their coöperation so that they might have town planning, not next year or the year after, but in 1934.

Sir FRANCIS FREMANTLE said that houses were growing up generally in a way that was a disgrace to the present age. Town planning required to come first and the housing afterwards. Planning was slacking unnecessarily owing to difficulty in visualising the future. He asked the Minister to tell local authorities that it was in their power now to plan provisionally for areas now purely rural, leaving the way open for a supplementary scheme later. It was essential to plan for the immense movement of population. About 100,000 persons were being moved out of London every year and settling down in the areas round. As far as possible they wanted to associate that movement with the resiting of factories. From a national point of view they did not want to encourage factories to move down from the North. The movement of factories must be allowed largely to decide itself, and the placing of houses ought to follow the placing of factories.

Sir HILTON YOUNG, Minister of Health, said that housing work and planning work had been brought together into a single department. His policy had always been directed towards the promotion of regional planning committees wherever they were required. Wisdom and progress were to be obtained by promoting reasonable coöperation between those authorities and not by arbitrarily overriding them. In ten years they had increased the number of executive committees from one to 75. He thought they had probably the most practical and efficient arrangement that they could get for the planning of London as long as London government was on the present lines. But he agreed that a problem for the future was the rationalisation of London government as a whole, in order, among other things, that the planning of London might be dealt with on a more reasonable basis.

Road Traffic Bill

In the House of Commons on July 26th a motion to agree with the Lords' amendments, deleting the provision in Clause 1 that the speed limit of 30 miles an hour should not apply in built-up areas between midnight and 5 A.M., was carried by 158 votes to 24. The House also agreed with the new clause inserted by the Lords making it illegal to sell a motor vehicle which was not fitted with an efficient silencer.

HOUSE OF COMMONS

THURSDAY, JULY 26TH

Encephalitis following Vaccination

Mr. GROVES asked the Minister of Health whether his attention had been called to the death of Leonard George Jennings, aged 18 years, who died from encephalitis resulting from vaccination, performed as a condition of employment with the Gas Light and Coke Company; whether he was investigating this case; and whether he would call the attention of employers of labour to the possible dangers of vaccination.—Sir HILTON YOUNG replied: The answer to the first two parts of the question is in the affirmative. As regards the last part, the opinion has already been expressed in circulars issued by my Department that it is not generally expedient to press for the vaccination of children of school age or of adolescents who have not previously been vaccinated, unless they have been in personal contact with a case of small-pox or directly exposed to small-pox infection.

Maternal Mortality Circular

Captain ELLISTON asked the Minister of Health when he proposed to issue to local authorities the promised further circular on maternal mortality.—Sir HILTON YOUNG replied: I hope to issue this circular in the early autumn.

MONDAY, JULY 30TH

Eggs Supplied to Pensions Hospitals

Captain HEILGERS asked the Minister of Pensions the country of origin of eggs supplied to patients in the Queen Mary's Hospital, Roehampton.—Captain HUDSON, Lord of the Treasury, replied: The country of origin of the eggs used at this and other Ministry hospitals varies according to the season and current contract prices. A preference of 25 per cent. ad valorem is given to English eggs over foreign.

Diphtheria at a Grammar School

Mr. HALES asked the Minister of Health if his attention had been called to a serious outbreak of diphtheria at the Chipping Campden grammar school and that the outbreak was stated to have been spread by those students attending the school who used a private swimming pool at Broad Campden, the water of which was not changed more than once a year; and if he would take steps to have all su pools brought under the supervision of his inspectors. Mr. SHAKESPEARE replied: Only one case of diphth was notified in the Campden Rural District during the l four months. In his annual report the Medical Officer o Health reported that 21 cases occurred in 1933, most o them at this school. My right hon. friend has no information that the outbreak was attributed to infection from bathing, and he is not aware that the causal organism of diphtheria has ever been found in water. As regards the second part of the question, the Public Health Act, 1875 gives the local authority or any of their officers a right of entry to any premises for the purpose of ascertaining whether any nuisance exists, and my right hon friend does not think that it would be good policy for detailed inspection of swimming pools to be carried out by officers of the central authority.

Inspection of Private Swimming Pools

Mr. HALES asked the Minister of Health what control was exercised by his department over private swimming pools for which a charge for admission was made; if regular inspections were made by qualified inspectors of the water; and, if not, would he in the public interest take the necessary steps to see that they were brought under his jurisdiction.—Mr. SHAKESPEARE replied: My right hon. friend has no statutory powers to exercise direct control over these pools. As stated in my answer to a previous question the Public Health Act, 1875, gives a right of entry to the local authority or any of their officers for the purpose of ascertaining whether any nuisance exists and my right hon friend proposes to call attention to these powers in his next annual report, which will shortly be issued.

Exhaust Fumes of Motor Vehicles

Mr. ALBERY asked the Minister of Transport whether any steps had recently been taken to ascertain what harmful effects are being suffered in crowded thoroughfares as a result of the exhaust fumes of motor vehicles.—Mr. HORE-BELISHA replied: This matter came under the consideration of a Home Office Departmental Committee a year ago. Their report did not suggest that there was any such evidence of injury being caused by exhaust fumes to the health of drivers and conductors or of persons using the highway as would justify legislative action. I may, however, add that the examiners appointed under the Road Traffic Act, 1930, and the Road and Rail Traffic Act, 1933, are required to look for defects in exhaust pipes in the public service vehicles and goods vehicles which they examine.

Use of Motor Horns at Night

Mr. WILLIAM SHAW asked the Minister of Transport whether it was his intention to schedule areas in which during certain night hours the use of motor-horns would be forbidden; and whether this experiment was to be confined to the metropolitan area.—Mr. HORE-BELISHA replied: I intend to try this experiment and not to limit it to the metropolitan area.

Hospital Treatment of Pensioners

Sir WILFRID SUGDEN asked the Minister of Pensions the future policy of his department in regard to hospital treatment of pensioners; whether it was proposed to continue the existence of Ministry of Pensions institutions or whether pensioners would receive in-patient treatment in voluntary and/or rate-aided hospitals at the Ministry's expense; when such change, if any, would be effected; and if he would state the number of pensioners admitted to Ministry institutions for treatment for the years 1931, 1932, and 1933, and the number admitted to other institutions for treatment, approved by the Ministry, for the same years.—Major G. C. TRYON replied: The policy of the Ministry is to make use of civil hospitals as far as possible consistently with the interests of the Ministry's patients, but there are certain types of war disability as, for example, nervous and mental disorder, epilepsy, paraplegia, and certain types of surgical case, for which either ordinary civil institutions do not provide which can be more suitably dealt with in specialised nistry institutions. No change is contemplated in s policy, which will continue to be pursued so long as the erests of the patients demand. The particulars asked for the remainder of the question are as follows:—

Number of cases (not including pensioners certified as unsound mind in Public Mental Hospitals) admitted hospital as in-patients—

	1931	1932	1933
military hospitals, including Queen Mary's Hospital, Roehampton	7,501	6,264	5,790
a voluntary hospitals and general civil hospitals ..	3,478	2,541	1,966
Total	10,979	8,805	7,756

TUESDAY, JULY 31ST

Medical Inspection of Mental Defectives

Dr. O'DONOVAN, asked the Minister of Health if his attention had been drawn to remarks by the Recorder of the City of London concerning a woman detained at Epsom under sub-section (1) of Section 11 of the Mental Deficiency Act, 1931; and if he would institute inquiries whether any special amendment of the Act with regard to the frequency of medical inspections was called for in the light of experience of the working of the Act.—Sir HILTON YOUNG replied: Yes, sir. These remarks appear to have been based upon inadequate information. Apart from the periodical statutory reviews to which the Recorder referred, mental defectives in institutions are under the constant observation of the medical staff. Suitable cases are frequently given leave of absence to test their fitness for discharge, and the Board of Control can discharge any patient at any time. The second part of the question does not, therefore, appear to arise.

Certified Dairy Herds in Scotland

Commander COCHRANE asked the Secretary of State for Scotland whether he was aware that, in the case of a certified herd, the Department of Health for Scotland stated that the proprietor had no right of appeal against the decision of a county veterinary surgeon and had declined to appoint an impartial arbiter at the expense of the proprietor; and whether, in view of the importance of the matter to all proprietors of certified herds, he proposed to take any action.—Sir GODFREY COLLINS replied: Under the Milk (Special Designations) Order (Scotland), 1930, which regulates these matters, there is a right of appeal to the Department of Health by the licencee of a certified herd against the decision of a licensing authority to refuse or revoke a licence. There is no provision for an appeal on any other ground, and I understand that although the Order, or one in similar terms, has been in operation for many years, no request has been made for an extension of the right of appeal. The Order is at present under revision in view of the provisions of the Milk Act, 1934, and the question whether the Order should be amended in this direction will be considered.

Turkish Compensation for Death of British Officer

Mr. EDEN, Lord Privy Seal, stated that the Turkish Government had of their own initiative expressed a desire to make a voluntary payment to the relatives of the late Surgeon-Lieutenant Robinson, who was shot dead by a Turkish sentry off the coast near Samos. The compensation, he said, amounted to £2000, and he understood that this sum had already been paid.

MEDICAL NEWS

Royal College of Physicians of London

At a meeting on July 26th, with Lord Dawson of Penn, the president, in the chair, the following fellows of the college were elected officers for the ensuing year:—

Censors: Prof. W. Langdon Brown, Dr. Charles Bolton, F.R.S., Dr. Gordon M. Holmes, F.R.S., and Dr. Letheby Tidy. Treasurer: Dr. S. P. Phillips. Registrar: Sir Raymond Crawfurd. Harveian Librarian: Dr. Arnold Chaplin. Assistant Registrar: Dr. C. E. Newman. Library Committee: Dr. H. R. Spencer, Dr. J. J. Conybeare, Dr. A. E. Clark-Kennedy, and Dr. J. D. Rolleston. Curators of the Museum: Dr. G. E. Beaumont, Dr. Maurice Davidson, Dr. H. Gardiner-Hill, and Dr. R. A. Hickling. Finance Committee: Dr. T. Watts Eden, Dr. C. R. Box, and Sir Charlton Briscoe.

The following were elected examiners:—Chemistry: Mr. Herbert Lambourne and Mr. C. S. Gibson. Physics: Mr. W. H. White and Prof. F. L. Hopwood. Materia Medica and Pharmacology: Dr. Philip Hamill, Dr. K. D. Wilkinson, Dr. E. Gordon Holmes, Dr. Clifford Hoyle, and Dr. R. St. A. Heathcote. Physiology: Prof. C. A. Lovatt Evans, F.R.S., and Prof. D. T. Harris. Anatomy: Dr. Thomas Yeates. Pathology: Dr. C. M. Wilson, Dr. C. F. T. East, Prof. Geoffrey Hadfield, and Dr. P. N. Panton. Medical Anatomy and Principles and Practice of Medicine: Dr. David Forsyth, Dr. C. M. Hinds Howell, Dr. Theodore Thompson, Dr. A. G. Gibson, Sir Maurice Cassidy, Dr. Reginald Miller, Dr. H. C. Cameron, Dr. A. E. Naish, Sir Stanley Woodwark, Dr. Anthony Feiling, Prof. W. H. Wynn, and Dr. J. W. McNee. Midwifery and Diseases peculiar to Women: Mr. J. M. Wyatt, Mr. A. J. McNair, Mr. Leslie Williams, Prof. Daniel Dougal, and Prof. R. P. Ranken Lyle. Public Health: (Part I.) Prof. M. E. Delafield, and (Part II.) Dr. C. T. Maitland. Tropical Medicine: Prof. R. T. Leiper, F.R.S., and Dr. N. Hamilton Fairley. Ophthalmic Medicine and Surgery: Dr. W. J. Adie. Psychological Medicine: (Part I.) Dr. R. D. Gillespie and (Part II.) Dr. S. A. Kinnier Wilson and Dr. A. A. W. Petrie. Gynæcology and Obstetrics: Mr. J. P. Hedley. Laryngology and Otlogy: Mr. Lionel Colledge. Radiology: Mr. James Hancock Brinkworth, D.Sc., and Dr. H. K. Graham Hodgson.

The following appointments were announced: Sir Henry Dale, F.R.S., as Harveian orator, 1935 (the forthcoming Harveian Oration in October next will be delivered by Dr. James Collier); Dr. D. T. Davies as Bradshaw lecturer, 1935; Dr. J. S. Bolton, F.R.S., as Lumleian lecturer, 1935; Dr. A. A. Moncrieff as Goulstonian lecturer, 1935; Dr. J. D. Rolleston as FitzPatrick lecturer, 1935; Prof. C. R. Harington, F.R.S., as Oliver-Sharpey lecturer, 1935; Prof. C. G. Seligman, F.R.S., as Lloyd Roberts lecturer, 1935; and Sir Bernard Spilsbury as Croonian lecturer, 1936.

The Murchison scholarship was awarded to Stanley George Browne, M.R.C.P., of King's College Hospital medical school. Sir Humphry Rolleston was re-elected a representative of the college on the executive committee of the Imperial Cancer Research Fund, and Dr. Letheby Tidy the representative on the General Medical Council.

The college expressed its full sympathy with the efforts of the Anti-Noise League to secure an abatement of avoidable noise.

The President briefly reported on the valuable work done at the request of the college by Dr. D. T. Davies, Dr. L. E. H. Whitby, and Dr. H. K. Graham Hodgson in a joint research into pneumococcal penumonia. The college undertook to sponsor the publication of this report.

The President reported the progress of the tuberculosis survey scheme, which had been approved by the comitia in principle on a previous occasion. He explained that it was intended to investigate pre-clinical tuberculosis, by means of clinical investigation radiological examination, and Mantoux-testing. A series of expert committees had sat and reported on standard techniques for the radiological and tuberculin investigations, so as to ensure uniformity throughout the working of the scheme. There had been great difficulties in arranging for the widespread coöperation between many different bodies and persons, by which means alone so large an enterprise could succeed, but all these problems appeared to have been solved. It is, however, proposed to institute the survey only on a limited scale, in the boroughs of Camberwell, Bermondsey, and Westminster, during the first year, in case of difficulties arising, but it was the unanimous opinion of the experts who have been consulted that even if the scheme as a *whole cannot be carried through very valuable information* will be obtained.

A report of the committee of management was considered and the following recommendation of the committee was approved :—

> "That the present regulations regarding the admission of graduates in medicine and surgery of recognised foreign universities be revised as from Oct. 1st, 1934, to provide that such graduates be admissible direct to the examination in anatomy and physiology, and, after passing in these subjects, be required to follow for 36 months the practice in medicine, surgery, and midwifery of a recognised medical school and hospital in Great Britain or Ireland before they are admissible to the final examination."

The following candidates satisfied the censors' board and were admitted members of the college :—

Clifford Edward Allen, M.D. Lond. ; Charles Barry Bamford, M.D. Liverp. ; Hugh Astley Cooper, M.B. Lond. ; James Fenton, M.D. Birm. ; David Glass, M.B. Belf. ; Idris Griffiths Jones, M.B. Lond. ; Kenneth David Keele, M.B. Lond. ; Alexander Kennedy, M.B. Lond. ; George Raymond Kirk, M.B. N.Z. ; Don John Telesphor Leanagé, M.D. Lond. ; Terence Joseph Lee, M.B. Melb. ; Leslie George Norman, M.B. Lond. ; Wilfred Harding Owles, M.B. Oxf. ; Albert Ray Southwood, M.D. [illegible] herland Strachan, M.D. Glasg. ; Edı [illegible] M.D. Lond. ; and Hovsep Aghék Y [illegible]

Licences to practise were conferred upon 159 candidates (141 men and 18 women) who have passed the final examination of the Conjoint Board and have complied with the college by-laws. The following are the names and medical schools of the successful candidates, viz. :—

Winifred L. L. Acraman, Cardiff ; M. Altmann, Frankfurt and London ; Alberta I. Andrews, Royal Free ; Margaret D. Baber, Univ. Coll. ; K. C. Bailey, Camb. and St. Thos. ; Mary Barber, Royal Free ; T. L. Barbour, Camb. and Guy's ; C. Bard, London ; F. R. Berridge, Camb. and St. Geo. ; R. H. Blazeby, Guy's ; C. H. Bliss, St. Thos. ; J. R. Bodington, Camb. and London ; A. G. W. Branch, Bristol ; N. P. Brown, Camb. and Middx. ; E. J. Bury, Camb. and St. Mary's ; I. Byer, St. Bart.'s ; W. A. Carey, Camb. and King's Coll. ; R. M. Case, Birmingham ; Jean M. Cass, Royal Free ; A. M. Chapnick, Westminster ; S. C. Chatterjee, Calcutta and West London ; R. F. Clarke, St. Bart's S. G. Clayton, King's Coll. ; H. M. Clegg, Leeds; Gladys E. Clyne, Royal Free ; S. G. Collingwood, St. Bart.'s ; A. B. Concanon, Liverpool ; D. D. Cranna, Manchester ; F. H. Culshaw, Camb. and St. Bart.'s ; R. S. Dale, St. Mary's ; D. H. Davies, Camb. and Middx. ; D. L. L. Davies, St. Bart.'s ; G. M. Denning, Camb. and St. Mary's ; F. H. D'Souza, Guy's ; N. J. Dias, St. Bart.'s ; Bessie Dodd, Liverp. ; Dorothy S. R. Drew, Royal Free; R. C. Easterling, King's Coll. ; T. S. Eddy, Cape and Guy's ; K. C. Eden, Univ. Coll. ; J. D. Fergusson, Camb. and St. Thos. ; I. C. Fletcher, Camb. and Middx. ; A. F. Fowler, St. Thos. ; P. S. Fox, Leeds ; C. S. France, Manchester ; I. N. Fulton, Camb. and St. Bart.'s ; E. Galinsky, Univ. Coll. ; R. H. Gardiner, Oxon and King's Coll. ; J. C. Garland, Middx. ; D. J. Gilbert, King's Coll. ; A. J. [illegible] St. George's ; C. H. Goodliffe, Birmingham ; M. E. [illegible] O'D. C. Grattan, Camb. and St. Thos. [illegible] ; P. R. Greeves, Oxon and Middx. ; A. V. [illegible] V. P. Gupta, Lucknow and West London ; A. H. Hall, Univ. Coll. ; H. A. Hamilton, Camb. and Guy's ; M. Hamilton, Univ. Coll ; E. A. Hardy, Westminster ; E. E. Harris, Camb. and St. Bart.'s ; O. L. Hewson, Birmingham ; J. H. Hovell, Charing Cross ; T. H. Howell, Camb. and St. Bart.'s ; J. H. Hudson, Leeds ; H. C. Hugh, St. Bart.'s ; J. Hughes, Camb. and St. Bart.'s ; C. C. Hurst, Manchester ; J. R. Hutcheon, London ; I. H. Jenkins, St. Thos. ; J. R. R. Jenkins, St. Bart.'s ; B. S. Jirge, Bombay and London ; D. M. Jones, Cardiff and St. Bart.'s ; E. J. Jones, Cardiff and Middx. ; E. I. Jones, King's Coll. ; J. E. V. Jones, Camb. and St. Thos. ; R. N. Jones Birmingham ; W. M. P. Jones, Cardiff ; Nora L. Keevil, Royal Free ; J. H. Kellgren, Univ. Coll. ; M. B. Khan, Leeds ; D. M. King, Cape Town ; N. F. Kirkman, Manchester ; R. M. Kirkwood, St. Bart.'s ; Freda H. Knight, Manchester ; R. W. G. [illegible] Oxon and Manchester ; J. L. Lanceley, Liverpool [illegible] Camb. and St. Thos. ; J. V. Laverick, [illegible] Lewis, Manchester ; F. D. M. Livingstone, Camb. and St. Bart.'s ; M. C. W. Long, St. Mary's ; A. J. McCall, Liverpool ; D. C. MacCarthy, St. Bart.'s ; D. P. McCoy, Camb. and St. Bart.'s ; G. G. Macdonald, Univ. Coll. ; E. H. Markby, London ; T. D. M. Martin St. Thos. ; A. G. C. Mason, Middx. ; E. B. Z. Masterman, Camb. and St. Bart.'s ; S. G. Mayer, Camb. and London ; A. Moore, Univ. Coll. ; G. H. Moore, Manchester ; P. Morr [illegible] Moynahan, Univ. Coll. ; P. H. Newma [illegible] Guy's ; Ivy E. Oliver, Royal Free ; M [illegible] G. R. C. Palmer, St. Thos. ; R. S. [illegible] R. Peters, Univ. Coll. ; R. A. Piachaud, [illegible] T. H. Pierce, Liverpool ; E. H. Platts, Camb. and Leeds ; R. H. Purnell, St. Bart.'s ; L. Rabinovitch, Leeds ; F. Riggall, Western Univ. (Ontario) ; W. G. S. Roberts, Birmingham ; A. T. Roden, St. Bart.'s ; Katharine C. Rogers, Royal Free ; M. Rooms, Leeds ; W. T. Ross, Cape and St. Bart.'s ; C. R. St. Johnston, Birmingham ; Irene E. Sandford, Royal Free ; D. Sanyal, Lucknow and London ; R. S. F. Schilling, St. Thos. ; E. A. Schott, Heidelberg and Guy's ; S. K. Sen, Patna ; H. H. S. Sherwill, Edinburgh ; H. G. Silvester, Univ. Coll. ; N. Sivolella, St. Bart.'s ; K. Soddy, Univ. Coll.; A. W. Stal Camb. and St. Bart.'s ; J. Starkie, Manchester ; J. R. St. Stead, London ; F. G. St. C. Strange, London ; J. S. F. Sut Guy's ; J. C. Thomas and M. J. H. Thomas, U Coll. ; Mary G. Thomas, Bristol ; L. N. Trethowan, Guy R. H. A. Turner, Camb. and Westminster ; T. H. Tulp Bombay and West London ; R. W. D. Turner, Camb. and Thos. ; J. K. B. Waddington, Liverpool ; R. C. Walch, Manchester and St. Bart.'s ; Kathleen M. Webster, Royal Free ; B. Weiner, St. Bart.'s ; O. C. Wilkinson, Birmingham ; M. W. Williams, Univ. Coll. ; F. L. Wollaston, Bristol ; B. L. E. Wong, Guy's ; G. M. Woolford, St. Thos. ; Fanny D. Wri Royal Free ; K. H. Wright, Guy's ; and Betty M. Zeal, Univ Coll.

Diplomas were conferred (jointly with the Royal College of Surgeons) upon candidates whose names were given in our issue of July 21st (p. 172).

The college will be closed for cleaning on Saturday, August 4th, and will reopen on Monday, Sept. 17th.

University of London

At recent examinations the following candidates were successful :—

M.D.

Branch I. (Medicine).—H. G. Anderson, St. Bartholomew's Hosp. ; W. E. K. Coles, Univ. College Hosp. ; T. A. L. Davies, St. Thomas's Hosp. ; S. N. Evans, Guy's Hosp. ; Anderson Garland, King's College Hosp. ; J. C. Heather, Guy's Hosp. ; L. H. Howells, London Hosp. ; K. D. Keele, St. Bartholomew's Hosp. ; Alexander Kennedy, St. Thomas's Hosp. ; F. P. L. Lander, Middlesex Hosp. ; L. G. Norman (University Medal), Univ. College Hosp. ; † Edward Renbom, St. Bartholomew's Hosp. ; T. S. Stone and F. W. Ta'Bois, London Hosp. ; M. R. Thomas, Univ. College Hosp. ; F. W. Willway, M.S., King's Coll. Hosp. ; and A. L. Wingfield, St. Thomas's Hosp.

† Awarded a Mark of Distinction.

Branch II. (Pathology).—Dorothy Woodman, Lond. (R.F.H.) School of Med. for Women.

Branch IV. (Midwifery and Diseases of Women).—Marian J. Cunning, Lond (R.F.H.) School of Med. for Women ; and K. M. Masani, Middlesex Hosp.

Branch V. (Hygiene).—R. C. Cohen, Univ. College Hosp. and Lond. School of Hyg. & Trop. Med. ; D. D. Payne, St. Thomas's Hosp. and Lond. School of Hyg. & Trop. Med. ; and G. E. B. Payne, Univ. College Hosp. and Lond. School of Hyg. & Trop. Med.

B. St. J. Steadman has satisfied the examiners in the third (B.D.S.) examination in dental surgery and R. F. Pusey has passed in Group I. of the examination.

Royal College of Physicians of Edinburgh

The council will shortly award two Kirk Duncanson fellowships for medical research. Particulars will be found in our advertisement columns.

Royal College of Surgeons of Edinburgh

At a meeting of the college on July 25th, with Dr. A. H. H. Sinclair, the president, in the chair, the following, who passed the requisite examinations, were admitted Fellows :—

George Herbert Cashmore, M.B. Adel. ; John Rupert Crumbie, M.R.C.S. Eng. ; Philip Norman Cutner, M.B. Edin. ; Henry Leslie Nugent Davies, M.B. Birm., Alexander Duff, M.B. Glasg. ; Ronald Walter Graham-Campbell, M.R.C.S. ; Bruce Rudolph Hallows, M.D. Melb. ; Rowland Anthony Harold Krynauw, M.B. Edin. [illegible] Kellar, M.B. Sydney ; Nathan Pencharz, [illegible] Wilfred Pottinger, M.B. Sydney ; Suresl [illegible] M.B. Calcutta ; Cyril Francis Sullivan, M.D. Ontario ; Abraham Track, M.D. Toronto ; Desmond Coleman Trainor, M.B. Sydney ; Albertus van der Poel, M.B. Edin. ; Andrew Watt, M.B. Edin. ; Robert James Wilson Withers, M.B. Belf. ; and Arthur Greville Young, L.R.C.P. Edin.

The following candidates were granted the diploma of L.D.S.

S. H. Harrison, Eleanor L. Mackinnon, I. J. G. Mowat, G. H. Fletcher, E. I. Kohn, E. M. Hope, Ernst Levy, Siegfried Bendix, N. G. Henry, and W. M. Hendry.

Scottish Conjoint Board

At recent examinations by the Board of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following candidates were successful :—

L.R.C.P., L.R.C.S., AND L.R.F.P.&S.

[illegible] rtz, Eleonore Bergmann, John [illegible] Koebner, Ernst Lucas, S. K. [illegible] C. H. Rothschild, C. Becker, [illegible] Walter Auerbach, Werner [illegible] Kurt Samson, [illegible] Alfons [illegible] ltmann, [illegible] Perkins, Erich Gostynski, M. S. Khan, [illegible] Hans A. S. W. Buchanan, R. H. [illegible] J. R. Jungmann, Richard Hamburger, Mathilde [illegible] Bruce, H. A. Thorner, J. F. Macgregor, L. C. Goldwater, Harry Fleming, P. T. Hauff, F. A. Paul, and L. H. Becker.

ADDRESSES AND ORIGINAL ARTICLES

THE TOXÆMIAS OF PREGNANCY*

By DAME LOUISE McILROY, D.B.E., M.D.,
D.Sc. Glasg., D.Sc. Lond., F.C.O.G., M.R.C.P.
DIRECTOR OF THE OBSTETRICAL AND GYNÆCOLOGICAL UNIT,
ROYAL FREE HOSPITAL, LONDON; PROFESSOR OF
OBSTETRICS AND GYNÆCOLOGY IN THE
UNIVERSITY OF LONDON

I.—CLINICAL AND BIOCHEMICAL INVESTIGATION

WHAT do we understand by the term "toxæmia of pregnancy"? It is difficult to define it, for no specific toxin has been found in connexion with this group of clinical symptoms. We know very little about toxæmia. We know that some alteration takes place in normal pregnancy and that there is an exaggeration of this alteration which is due directly to gestation or to some previous functional derangement in the maternal organism. It is also impossible to make any exact classification of the toxæmias of pregnancy, for their manifestations are varied. The cut-and-dried classification of the text-books is out of date and for teaching purposes we can only describe various symptoms or groups of symptoms. Different symptoms may preponderate at various stages of pregnancy but the ultimate cause is the same in most cases.

If we had a fuller knowledge of the metabolic changes which normally take place in pregnancy we might better appreciate the danger signals. At present we muddle along and occasionally someone throws a beam of light to guide us on our way. Physiologists as a whole, with the exception of Noel Paton, Cathcart, Pembrey, Barcroft, Mellanby, and Mrs. Mellanby, have taken little interest in the study of human metabolic function in pregnancy. What knowledge we have of toxæmia we have had to acquire ourselves with the help of the biochemists in hospital laboratories. To-day, however, as a result of the establishment of antenatal treatment, there is a wealth of material for investigation at hand in our hospitals and clinics. The earlier causes can be recognised the earlier will symptoms be treated and serious complications prevented.

The subject of toxæmia should be freed from old theories. It should be approached from a much wider standpoint. It has been proved of late that the toxic condition is due mainly to deficiencies in nutrition, and in most cases it is associated with some breaking down of the normal functional activities of various digestive and excretory organs.

The significance of the gravity of the patient's condition must necessarily be determined from clinical observation until further definite laboratory tests are obtainable. Our diagnosis is in most cases limited to the investigation of the reaction of the patient to the disease and to the treatment we have carried out successfully or otherwise. Laboratory work has helped in research but the multitude of tests which are devised from time to time are of little practical value unless they can be adapted for clinical use.

Influence of Toxæmia upon Maternal Mortality and Maternal Morbidity

Puerperal sepsis is given first place in all statistical returns of maternal death-rates. In most of these we find that toxæmia comes next in the list. In the Registrar-General's returns for the years 1921–30 this factor is given a high place. But deaths from hæmorrhage, accidents of pregnancy, and abortion owe their origin in a large measure to the malnutrition of the patients as the result of diet deficiencies. In the Royal Free Hospital the maternal death-rate for the years 1921–30 was 2·8 per 1000. If the deaths from toxæmia, obstetric shock, and hæmorrhage were added together they would stand much higher in the causation of death than puerperal sepsis. We know from experience that one of the most important predisposing cases of sepsis is toxæmia or malnutrition and that, therefore, the toll of maternal death-rate from sepsis could be reduced by the improved prophylaxis of toxæmia. The recent investigations of workers on toxæmia have opened up a new era in the prevention and treatment of complications of pregnancy due to malnutrition and diet deficiency. This research will expand and will give promising results as soon as the obstetricians realise that it is on these lines that their attention is to be focused. The maternal mortality-rate will be reduced in time by careful attention to diet deficiency and the consequent malnutrition, just as infant mortality and morbidity have been reduced by expert supervision of nutrition through infant welfare clinics or attention in private practice.

Bingham[1] states that in U.S.A. over 4000 women die annually from toxæmia and that this is to a great extent a preventable disease. In the recent Maternal Mortality Report of New York[2] the high rate of toxæmia is mentioned, and stress is laid on the assumption that the vast majority of deaths from this cause were preventable by medical supervision early in pregnancy. Of 251 patients that died of eclampsia only 63 were regarded as not preventable; 45 per cent. of the infants were stillborn. The highest incidence was amongst negresses who had less supervision and suffered from malnutrition.

Munro Kerr[3] gives the rate in Scotland from hyperemesis gravidarum alone as 4·6 per cent. of the total maternal mortality in 1925–30 and states that the condition is on the increase. In England and Wales this same condition was responsible for 1·7 per cent. of the total maternal death-rate for a similar length of time. Munro Kerr states that there has been no decline in the maternal death-rate from causes such as pre-eclampsia, eclampsia, and chronic nephritis. In the Glasgow Maternity Hospital, toxæmia is responsible for 25·3 per cent. of the total maternal mortality.

MATERNAL MORBIDITY

There is no means of arriving at a comprehensive or general estimate of the end-results of toxæmia of pregnancy. The follow-up researches of various clinics give ample proof of the far-reaching effects of this condition and the disablement from which women suffer as the result of childbearing. We have only to mention renal disease as an example. The chronic ill-health of women who have borne children is a commentary upon the state of our knowledge of the field of obstetrics, and is a responsibility not always recognised by public service authorities who have the care of the health and nutrition of the poorer classes. Something will have to be done about it. We achieve much when we point out that toxæmia is mainly a deficiency disease and make every endeavour to train the future practitioners along these lines. I need not dwell upon the loss of health or of the ultimate loss of life as the result of childbearing. This subject has been very ably dealt with by Prof. Blair-Bell,[4] my predecessor in these lectures.

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* The Ingleby lectures for 1934, delivered at the University of Birmingham on April 26th and May 3rd. The concluding lecture will appear in a forthcoming issue.

FŒTAL AND INFANT MORTALITY

It is impossible to indicate in any way how far toxic conditions in the mother are responsible for fœtal and neonatal deaths. Until we have a system of notification of all abortions similar to that which we have of viable births, we cannot get much information regarding the cause of the enormous wastage of early fœtal life. Malnutrition of the mother obviously influences malnutrition of the fœtus. There are exceptions to this, however, as we know that badly nourished women produce healthy infants, although at the expense and often grave risk of their own well-being. Abortions, moles, dead- and stillbirths are the consequence in most cases of maternal toxæmia.

In the Royal Free Hospital, during a period of ten years, the highest cause of the stillbirth-rate was toxæmia of the mother. In the neonatal death-rate, 65 per cent. were due to prematurity, which is closely associated with malnutrition of the mother. Premature and badly nourished infants die or survive only with great difficulty. The fatal cases provide statistics for the two great causes of infant mortality in the first month of life—a mortality which still shows no sign of reduction when compared with that of the 11 months, the death-rate of which has been reduced to half in the present century.

Mellanby[5] states that the death-rate of infants for the first week of life is 23·5 per 1000 as compared with 3·3 per 1000 during the first four weeks. If dead and stillbirths are included the rate is 80 per 1000. This mortality is not being reduced and he puts diet deficiencies in the mother as an important cause.

Ætiology of Toxæmia

There are as yet no known specific toxins in pregnancy, although the manifestations are very similar to toxic poisoning from snake venom, phosphorus, &c. The main centre of attack seems to be in the liver and kidneys. A great deal of valuable time has been wasted in discussions upon the best methods of investigation of elusive toxins. We are now getting down to a more rational outlook and have concentrated upon the condition from its metabolic aspect.

The ovum no doubt is the primary ætiological factor, as without it presence there may have been few symptoms of toxæmia previously. A healthy young woman becomes pregnant, she must adapt her physiological functions to the new condition of affairs. The ovum is a newcomer—or as I like to call it, a temporary endocrine organ—and soon makes its presence felt and is insistent upon the proper recognition of the maintenance of its physiological existence. If the ovum fits into its surroundings the pregnancy becomes a harmonious one and all ends happily. The course may not be smooth just at first—for example, if morning sickness is troublesome. It is really this adjustment which is the difficulty. The maternal functions may be slow to adapt themselves to the new conditions. The lodger may make imperious demands and deplete the hostess not only of her food-supply but of her tissue nutrition. Until a settlement is established either member of the ménage may come off the loser. If the adjustment fails the ovum acts as a parasite and tends to poison its hostess by special demands upon her liver. The ovum may itself die because of the depletion of the maternal supply of nutriment. On the other hand, the maternal organism may not be in a condition to take on the responsibilities of motherhood owing to previous toxic pregnancies or to failure in excretory function. The ovum in such a case is the loser. It may die and become expelled, or it may struggle on courageously and survive as an ill-conditioned infant, which lives to swell the numbers of the unfit.

THEORIES

The theories as to the ætiology of the toxæmias of pregnancy are very numerous and possibly all have some element of truth. The want of balance between the ovum and the maternal organism leads to a want of balance in the endocrine organs. These glands, especially the pituitary, owing to their secretions and their influence upon reproductive functions play a very great part in maintaining the harmonious relationships between the ovum and the maternal organism. What this exact function may be is not fully known, but our research workers are gradually building up valuable evidence for clinical use. The failure of the placenta to prevent the transmission of toxic substances from or to the ovum plays a considerable part in the toxæmia. Infarctions and other pathological or autolytic changes involving loss of function or separations of the placenta have been shown to be present in cases of toxæmia. The liberation of protein poisons in the maternal circulation may fail to become neutralised, or the placenta may be deficient in its neutralising function by which it acts as a safeguard for the ovum. Failure on the part of the liver to detoxicate injurious substances is also a well-accepted theory. Now we are finding out that this failure in function is due mainly to maternal malnutrition and can be remedied by attention to diet. Defective excretory function as the result of intestinal stasis or chronic nephritis plays a large part in the causation and maintenance of toxæmia. Raised intra-abdominal pressure in the latter third of pregnancy is also a factor. The activity of the trophoblast and blood-borne fragments of chorionic villi are given as a cause in the toxæmia of early pregnancy.

Not only are errors and deficiencies of diet of significance, but over-feeding, by causing embarrassment of the digestive and excretory functions, has to be kept in mind. The influence of nervous and mental changes upon the metabolism is most important. All these factors go to make up the complexities of pregnancy. A harmonious state of equilibrium of the maternal organs and of the embryo in most cases will ensure a normal condition during gestation.

PREDISPOSING CAUSES OF TOXÆMIA

By due attention to these we may avert the onset of an attack or modify its incidence.

Age and parity.—Toxæmia of the hepatic type occurs more frequently in primigravidæ. Of 65 cases in the Royal Free Hospital 57 were primigravidæ, 8 being multiparæ—i.e., a ratio approximately of 7 to 1. In 30 cases of eclampsia the ratio of primigravidæ to multiparæ was 4 to 1. Age does not seem to have a marked influence, although one expects the condition to occur in older women whose tissues react less favourably to the changes associated with pregnancy. Elderly primigravidæ are attacked, but I have seen eclampsia occur in a girl of 14½ years. In multiparæ the renal type is more likely to occur, especially in older women having had frequent pregnancies. Twins also have a predisposing influence upon the incidence of toxæmia.

Season has little or no influence in my experience of cases. Women living in town surroundings with deficient fresh air and sunlight are much more likely to have toxæmia than women in rural areas. This may account for some of the high incidence of eclampsia in Glasgow.

Disease.—Previous attacks of scarlet fever, diphtheria, rheumatism, and other toxic conditions tend to predispose to the renal type of toxæmia. Intestinal stasis is an important factor which in its turn may be due to pituitary functional defects, want of exercise, and vitamin deficiency.

Condition of ureters.—Pressure upon the ureters attended with dilatation of the renal pelvis is associated with urinary infections of the colon bacillus type. This bacillary infection is found in a considerable number of cases and may influence the onset of toxæmia. Pyelitis is sometimes associated with vomiting. It rather tends to be a sequela of toxæmia as it appears more frequently during the puerperium than in the antenatal period. Due care should always be taken in regard to the aseptic catheterisation of toxæmic patients.

Dietetic Factors

The recent work of Harding and van Wyck [6] on sodium chloride as a factor in the causation of toxæmia is of interest, as these authorities have directed their attention to the dietetic factor in the toxæmias of later pregnancy. They do not think that toxæmia is produced by diets rich in protein or fat. Ketosis will not produce nausea or vomiting in pregnancy. These authors point out the dangers, when protein is withheld from the food, of the consequent drain on the patient's own tissues, and give the result of interesting investigations upon the sodium base in sodium chloride or salt intake. If salt is freely given in the diet of a normal pregnant patient its effects are negligible; if, however, there is a tendency to toxæmia, the condition is intensified. They conclude that salt is the dietetic factor in the production of the toxæmias of later pregnancy. When hypertonic saline was given to normal pregnant patients, in one case, diarrhœa occurred, and headaches and gastro-intestinal disturbancss in another. They found that in cases of mild toxæmia there was increased albumin and hypertension together with vomiting, headaches, and epigastric pain. Thus the intake of salt resulted in the intensification of the toxic symptoms. When salt was withdrawn the toxæmia showed marked diminution. Salt also caused retention of fluid in the tissues and consequent œdema. Sweating and venesection are beneficial because of the lowering of the salt content in the tissues. Harding and van Wyck advise glucose solution as a substitute for saline transfusion.

Weight changes in toxæmia.—A considerable amount of recent research has been carried out by Davis,[7] Harding and van Wyck, and Bingham and others upon the significance of an undue increase of weight in pregnancy. This work throws a new light not only upon the prophylaxis of toxæmia but upon its ætiology. A large or sudden increase in weight in the latter part of pregnancy is very signficant of water retention in the tissues. It is, therefore, an earlier clinical sign than œdema. The normal gain in pregnancy should be not greater than 20 lb. (9 k.) except in the case of under-nourished women who have reacted to treatment. Bingham gives this gain at 16 lb. In the first three months there is little gain in weight. Primigravidæ gain less than multiparæ. Heavy women gain more than light, especially towards the later weeks of pregnancy. If the gain is excessive it is due to "occult œdema" and is associated with the sodium chloride intake. It is accompanied not infrequently by albumin in the urine and suggests the presence of toxæmia and of nephritis.

Regulation of diet.—The diet must be regulated and, if necessary, cut down in amount considerably. It is pointed out that at antenatal examinations the routine weighing of patients should be carried out as it is just as important as testing for albumin in the urine. Scales should be in the necessary equipment of every antenatal clinic. Harding and van Wyck point out that the coarsening in features which some women acquire in pregnancy is due to excessive food intake and fluid retention. This disappears after delivery. Stout women should not be allowed to gain more than 2 lb. a month in pregnancy. If this "latent dropsy" is recognised in time following the danger signal of sudden gain in weight, much of the consequences of renal dysfunction will be avoided. It is said that the diminution in eclampsia in Central Europe during the war was not due to a diminished protein intake alone but to reduction in diet as a whole. Bingham, on investigating a series of cases which had excessive monthly gains in weight, found that nearly all his cases of toxæmia were confined to this group. An increase in weight preceded the rise in blood pressure and the appearance of albumin.

As a result of these investigations I have instituted weighing machines in our clinics and the patients are weighed at each visit. In the short time of observation I have seen the value of weight-taking as a gauge of the condition of the patient. When the patient is advised to take exercise in the open air such as a two- or three-mile walk daily up to near the end of pregnancy, the benefit to the ordinary patient is remarkable. She becomes much more cheerful and her gain in weight remains normal. Patients suffering from cardiac or renal complications are, of course, not included in this treatment.

Classification

It is better to wipe out all the intricacies of the textbook labels and start afresh in view of our present-day knowledge of the varieties of toxæmia. Why should hyperemesis gravidarum be given the first position in our books? Is it because of its gravity or because the term is loosely used to denote the vomiting of pregnancy in the early months? Excessive vomiting is a very rare condition in pregnancy, and yet the student is taught to consider it as one of prime importance in obstetrics which may necessitate the termination of pregnancy. Surely this point of view is out of date. There are many cases of vomiting in early pregnancy which are amenable to medical treatment and do not require obstetrical interference. Discussions are rife in regard to the position of the degenerative areas in the hepatic lobules—a central area may indicate one form and a peripheral another form of toxæmia. Does this really matter? We do all we can to prevent our patients reaching the post-mortem room and make our diagnosis at the bedside with the valuable help of the clinical pathologist. The toxæmias of pregnancy with our present knowledge cannot be put into pigeon-holes. It is more than likely that there is very little difference between the various forms except that of degree: the peculiar manifestations depend to a great extent upon the individual patients who are concerned. Symptoms naturally vary in their onset, association, and gravity, and the same form of toxæmia in early pregnancy may be manifested in one case by severe vomiting, whereas in another individual it may show itself later as eclampsia or acute yellow atrophy. As far as we go at present, we can only divide the types into two main groups: (1) hepatic, and (2) renal. It may be that in the future we shall have information at our disposal which will enable us to classify the toxæmias in more detail with special reference to pituitary and other endocrine dysfunction.

HEPATIC TOXÆMIA

In the hepatic type the patient has been as a rule healthy before the onset of pregnancy and the toxic condition is due to failure on the part of the liver *to adjust itself to the new conditions on account of* deficiencies of certain substances which are necessary for its function and which are being withheld from the mother or drained away by the ovum for its own nutriment. This type is often acute, such as the fulminating form of eclampsia, acute yellow atrophy or the severe vomiting of early pregnancy. It is of short duration and may end fatally; if recovery does take place it is usually complete. There may, however, be some renal damage which becomes manifest during a subsequent pregnancy. This type is due in the majority of cases to deficiencies in diet or over-feeding.

The liver *is concerned* with the neutralisation of protein substances, and most investigators believe that if so-called toxins—which we might now call *x* or the unknown quantity—are found they will be of the protein variety. When the liver cells are destroyed by toxic substances, neutralising substances in sufficient amount, such as glucose and calcium, being withheld, the result is a severe condition of toxæmia. The tests for liver function are so varied and controversial that, as clinicians, we have still to rely upon our own observations for a due appreciation of the gravity of the condition. Jaundice with bile in the urine is a marked danger signal in cases of toxæmia. It may not be as delicate a test for the onset of liver damage as certain laboratory tests, but it is of value for clinical purposes. Some take the nitrogen partition of the blood and the excess of urobilin in the urine as a method of diagnosis of hepatic toxæmia. Globulin is said by some to be found in greater quantity than that which occurs in the toxæmia of renal origin. This *theory is queried* by Cruickshank.[8] Acidosis is closely associated with hepatic toxæmia. The loss of fœtal life is less marked in a hepatic toxæmia as the fœtus is, so to speak, the parasite which drains or poisons its mother. In the renal type the maternal tissues fail to convey sufficient nutriment to the fœtus, and the latter may die at any stage of its existence.

TOXÆMIA OF RENAL ORIGIN

Much has been written on this subject by such investigators as Kellog,[9] Young,[10] Gibberd,[11] Browne and Dodds,[12] Stander and Peckham,[13 14] Evans,[15] and Munro Kerr.[3] In the discussion of the subject at a meeting of the Obstetrical Section of the Royal Society of Medicine in November, 1933,[16] I pointed out the importance of the renal factor, and this point was discussed at greater length by Osman [17] and by Bright Banister [18] at the same meeting.

There is difficulty in the diagnosis of the condition in pregnancy and *often it is only on following up* the patients for some months or years after a pregnancy complicated with toxæmia that the extent of the renal damage can be estimated. There are two main types of renal damage. There is the type in which the kidney function seems to recover and remains healthy so long as the patient is not exposed to a subsequent pregnancy. If pregnancy which has been called the "acid test of renal function" occurs in these cases, there may be kidney breakdown which simulates toxæmia of the hepatic variety. Some confusion has been caused regarding the name which is to be applied to this type. It has been called the kidney of pregnancy, occult nephritis, low reserve kidney or lowered renal threshold, recurrent toxæmia (Kellog), and albuminuria of pregnancy. I think perhaps the simplest denomination is that of Stander and Peckham—low reserve kidney. The condition is that of an intermittent nephritis or nephrosis without any definite inflammatory changes. It often clears *up after the pregnancy is over unless the symptoms* have been severe or there have been repeated subsequent pregnancies, when it merges into the chronic nephritis type.

In the section on Nephritis complicating Pregnancy of the New York City Report [2] on Maternal Mortality and Morbidity, 1933, it is stated that it is often impossible to tell clinically the extent of the kidney damage. Stander and Peckham's [13] classification is referred as (*a*) chronic nephritis complicating pregnancy, (*b*) eclampsia and nephritis, and (*c*) low reserve kidney. The report refers to the last type as the Nephritis Toxæmia of pregnancy. The history before and after pregnancy is perhaps clinically the only method available for the diagnosis between the toxæmia of pregnancy and chronic nephritis. If the symptoms occur early in pregnancy the condition is more likely to be the nephritic type. Stander lays stress upon the urea and creatinin tests as an aid to diagnosis. If the urea clearance is below 80 per cent. of the normal and the creatinin excretion below 155 mg. in the first hour, renal damage is present. Previous chronic nephritis with pregnancy superadded is a definite renal lesion due to previous scarlet fever, diphtheria or other toxic disease, and where renal breakdown occurs early in pregnancy.

In the books on nephritis, among which one may mention that of MacLean,[19] I find very little stress placed upon childbirth as a cause of chronic nephritis. Few physicians dwell upon it and yet, from the obstetrician's point of view it is a very serious sequela of pregnancy. Gibberd,[11] especially in several publications of his research upon the follow-up of cases, *points to the gravity of the condition. Osman* [17] is one of the few physicians who seems to emphasise the necessity for investigating the history of previous pregnancies when dealing with cases of nephritis; he discusses at some length the presence of hypertension and oliguria following toxæmias of pregnancy. All observers upon the late results of this condition refer to the subsequent health disability involved as well as the fatal endings after several years. Young [10] found that when he followed up 91 cases of toxæmia, good health was observed in 58·3 per cent. of these, impaired or poor health in 41·7 per cent. Stander found in the Johns Hopkins Hospital that 42 per cent. of patients die of chronic nephritis within five years. Gibberd found in 41 cases of toxæmia that recovery was complete. When the next pregnancy occurred, albumin was found in 59 per cent. of the cases. He therefore advises induction of labour in all cases of toxæmia if albumin persists for three weeks, there being grave danger of permanent kidney damage if pregnancy is allowed to continue. Cruickshank refers to the advance attained in our knowledge of Bright's disease by the realisation that extrarenal factors play a much more important part in the pathogenesis and symptomatology than was previously supposed. He lays little stress upon the influence of pregnancy but mentions that the toxæmias of pregnancy cause renal degenerative changes which constitute a mixture of nephritis and nephrosis. Cruickshank gives over-eating as a factor in the causation of Bright's disease.

Miss Rodway, in the Obstetrical Unit *attached to* he Royal Free Hospital, followed up 50 cases of oxæmia and found the following results :—

There were 34 *primiparæ.*—None of these had any history of previous renal complications. Eighteen had good health, 2 showed chronic nephritis, 9 had raised blood pressure without albuminuria, and 1 had raised blood pressure with albuminuria. There were 4 with headaches and giddiness, but these did not have albuminuria or a raised blood pressure.

There were 16 *multiparæ.*—Seven of these had no history of renal complications at previous pregnancies. Of these 1 had good health, 2 had albuminuria (? chronic nephritis), 2 had raised blood pressure without albuminuria, and 2 had headaches. Nine cases had a history of previous renal complications. Of these 3 had chronic nephritis and 6 had raised blood pressure and general debility but no albuminuria.

TOXÆMIA AND THE TOXÆMIA OF PREGNANCY ASSOCIATED WITH RENAL DAMAGE

It is important not to confine attention to eclampsia alone in dealing with cases of toxæmia but to keep in mind the possibilities of late renal dysfunction, a condition the evidence of which in many cases may be suppressed until a subsequent pregnancy takes place.

Renal damage is a serious complication of pregnancy and becomes more so as subsequent pregnancies occur. The damage to fœtal life is also a consequence of renal damage in the mother. It is difficult to make a differential diagnosis between toxæmia of pregnancy and nephritis, and most clinicians agree that the diagnosis in some cases may have to be deferred until after-results of childbirth have been investigated. It must be remembered that renal damage may follow toxæmia. If the symptoms begin early in pregnancy, if they are insidious in onset, never reaching an acute stage, if childbirth is followed by ill-health, the condition is probably due to serious renal damage.

The following points may be of some use as a general guide :—

	TOXÆMIA	RENAL DAMAGE
Age ..	.. Younger women ..	Older.
Parity	.. Primigravidæ ..	Multiparæ.
Previous history.	Good health ..	Scarlet fever, diphtheria previous pregnancy toxæmia.
Onset	.. Late pregnancy, sometimes sudden.	Early pregnancy, insidious.
Abortion	.. Not usual	Frequent.
B.P. ..	.. Varies, very high sometimes but not prolonged.	High and prolonged, sometimes no other sign.
Eyes	.. Few changes	Retinitis.
Jaundice	.. Serious sign	Rarely present.
Urine	.. Diminished quantity. High sp. gr. Albumin copious.	Increased quantity. Albumin. Low sp. gr. Casts.
Blood	.. N.P.N. Lower post-partum. Urea lower than in pregnancy.	Higher post-partum than in pregnancy. Urea higher.
After-effects..	Rare unless subsequent pregnancies.	Almost constant.
Convulsions ..	Eclampsia in severe cases.	Uræmic convulsions.

Toxæmia as a Deficiency Disease

The recent investigations of Maxwell,[20] Mellanby, Lucy Wills,[21] Green Armytage,[22] Theobald,[23] and others have completely changed our ideas upon the causation of toxæmia. We are now working upon much more rational lines than hitherto, and the results of due attention to diet deficiencies will go far to reduce the incidence of toxæmia and moderate all its attendant ills.

In the present lecture I point out the demands of the fœtus and the means of supply at the disposal of the maternal organs. In the next lecture I shall refer to the actual methods of dieting when discussing symptoms and their treatment. As a means of illustrating my remarks I should like, if it will not bore too much, to mention my method of teaching students on this subject. I take as an example the needs of the fœtus. The fœtus goes out to buy its provisions at the retail or placental shop which is in its turn supplied from the wholesale or maternal store. What does the fœtus go out to buy ? It demands all the substances which are essential for the maintenance of its normal physiological growth and function. We know something of a number of these substances, such as calcium, and the carbohydrates. Others such as the protein supply still require investigation. The maternal store gives of its reserve supplies and keeps up its stock by constant food intake. If this intake is deficient for the fœtus the supply can still be provided by drawing upon the maternal tissues. If the latter are too much drained however, a serious condition of toxæmia will ensue. If the supply fails the fœtus dies from starvation. But one's clinical experience shows that the mother's welfare is inclined in most cases to be sacrificed to the maintenance of the well-being of her fœtus. It must also be remembered that the placental " shop " may be inadequately equipped or inefficiently managed. Failure of infiltration may take place and harmful substances may not be eliminated or the nutritive supplies may not be delivered.

Calcium together with phosphorus is a very necessary element in fœtal growth, more especially in the latter half of pregnancy when the bony tissues are increasing in bulk. The fœtal blood is of higher calcium content than the maternal, and the figure for the latter is lower in pregnancy than in the non-pregnant state. Stander gives 3·3 mg. per cent. as the normal blood calcium content in pregnancy as contrasted with the non-pregnant content of 10·2 mg. per cent. Theobald refers to the storage in the bones as the maternal " deposit account " and to that in the blood and soft tissues as the " current account." 1·6 g. of calcium is required daily in pregnancy. The fœtus retains 8 g. of calcium during the last four weeks of pregnancy, and Theobald is of the opinion that the diet is insufficient for this supply. If the calcium content of the mother is low, or if she is suffering from vitamin-D deficiency, she will possibly have signs of dental caries or pyorrhœa. In eastern countries osteomalacia may be in evidence. If the fœtus, therefore, does not get its supply from the mother's food it will endeavour to get its calcium from her tissues. If the placenta is inefficient the fœtus may be denied all its nutritive demands and may die. Deficient calcium and vitamins will cause fœtal rickets, maldevelopment of the teeth, and may produce sleeplessness and muscular cramp in the mother. Restlessness on the part of the fœtus is sometimes due to the same cause.

Calcium is eliminated by the urine and fæces. Some years ago I carried out some observations upon the calcium content of menstrual fluid and found that the figure for the menstrual was considerably higher than that for the systemic blood. I also estimated the total intake and excretion of calcium in oöphorectimised animals and found that there was more retention of calcium in these animals than in the normal. It is possible, therefore, that ovarian activity may be in abeyance in pregnancy in order partly to preserve the supply of calcium which is so much needed by the fœtus.

Glycogen is essential for the nutrition of the fœtus and for storage in its liver. The maternal liver may become depleted by the fœtal requirements and acidosis in the mother will be the result. Carbohydrates mainly in the form of glycogen are stored to a greater extent in the fœtal liver than in the adult.

The placental blood-supply *obtains its glycogen from* the maternal liver and passes it on to the fœtus. Although the mother may be deficient in glycogen the fœtus still demands its supply and will insist upon it at the expense of the maternal tissues. The *maternal liver when depleted fails in its function*, the alkalinity of the blood is lowered, and acidosis is the result. The mother suffers from sickness and this in its turn aggravates the deficiency. An adequate supply for the mother is kept up by feeding her with barley sugar and other carbohydrates.

Iron is essential for fœtal nutrition and blood formation. Storage of iron and copper takes place in the liver as nature's precaution against a faulty supply in the milk-feeding period of postnatal life. Shortage of iron and other minerals will cause anæmia of the mother, which sometimes is profound. Premature babies are frequently short of iron.

Manganese and *magnesium* are also essentials.

Iodine is necessary. Mellanby and Theobald point out the advantages to be gained by a diet with enhanced iodine content as the average food has a low iodine content. It may be necessary in most cases of maternal deficiencies to supplement the diet by giving these mineral substances directly to the mother. For this reason special methods of treatment are carried out which will be referred to later. *Vitamins are essential for the proper assimilation of* the various mineral commodities demanded by the fœtus. The diet supply of the mother may also require supplementing by cod-liver oil and other substances. It has to be pointed out although these *deficiencies on the part of the maternal supply and* the consequent depletion of her tissues may lead to toxæmia and malnutrition of the fœtus, we must remember that toxæmia may also be caused by excessive supply and that results of overfeeding may be *just as dangerous as deficiencies of diet.*

Mellanby points out that vitamin A is concerned with growth and is stored in the fœtal liver, and that if supply is defective the mother suffers from infective conditions. Vitamin-B deficiency is concerned with *abortion and death of the fœtus and vitamin C also* is associated with dead births. Vitamin D is essential for the absorption of mineral substances such as calcium. The diet of the mother will be discussed later.

Death of the fœtus occurs *if any interference takes* place with the supply or transport of its nutritive necessities. A deficiency in the essentials of diet in the mother with the malnutrition which follows from the draining of her tissues by the fœtus may cause fœtal death. *Also defects in the delivery of foodstuffs* by defects in the placenta owing to degenerative changes or separation and failure in function are all contributory factors towards fœtal death. Abortion may occur from definite known causes, but in the majority of cases which we are asked to treat the cause is unknown. In recurrent abortion administration of corpus luteum and thyroid extract or Antuitrin S in many cases will carry on a pregnancy to term. Dr. Pillman Williams has published an interesting report on the results of the investigation of a number of cases of recurrent abortion sent for treatment to the Royal Free Hospital. She examined the blood of these patients *in regard to sugar tolerance* and the urine for sugar leak.

Ninety per cent. of the patients showed a lower tolerance for glucose. When the carbohydrate diet was spaced by means of smaller and more frequent meals—30 g. three-hourly—*total per diem 150–200 g.* —the result was a successful termination of the pregnancy. Dr. Pillman Williams[24] states that a very considerable percentage of cases are related not to any failure of nitrogen metabolism but to gross *errors in carbohydrate metabolism*, a fact which is not sufficiently appreciated. These patients did not leak sugar on ordinary diet. Their fasting blood-sugars were either normal or only very moderately raised. She considers that the underlying cause of the lowered tolerance for glucose is related to a lack of balance of the ductless glands. Insulin was administered in a few cases with good results.

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LYMPHADENOID TISSUE OF THE UPPER RESPIRATORY TRACT

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THE lymphadenoid tissue at the threshold of the upper respiratory and food passages has been the object of so much surgical interference that the unsolved problem of its physiology may cause anxiety to those who are called upon to perform operations for extirpation of specialised parts of the lympho-epithelial system in this area. These specialised groups are the faucial and the respiratory tonsils.

Recently there appears to have been a greater tendency to examine the subject critically. Such an impression is gained, for example, from Kaiser's book,[1] from the paper by Glover and Joyce Wilson,[2] *from the published monograph by Layton*[3] and a later paper, and from the report of the chief medical officer of the Ministry of Health for 1931[4]; and the tonsil problem as it concerns the *faucial organ* was the subject chosen by Prof. Kahler for the Semon lecture of the University of London in November, 1932.[5] Since then a further article by Layton has appeared,[6] and Heiberg [7] has published the answers to his circular questionnaire on tonsillectomy results.

The anatomy of the faucial tonsil has been many times accurately described, and its general appearance is familiar to the practitioner from daily routine examination. Superficially, this may seem to be an advantage, but this ease of access has probably led not only medical practitioners but also lay people to speculate on its pathological significance, and its tantalising proximity may have led to its being charged with offences for which it is not altogether responsible.[*]

The respiratory tonsil is differently placed. It can be studied in situ in the living by the expert in posterior rhinoscopy, and sometimes by anterior rhinoscopy, but its direct examination with the finger should be reserved for the generally anæsthetised. This inaccessibility may not be a disadvantage. In spite of the harm which an untreated respiratory tonsil may cause, I have learnt to modify my enthusiasm against it. I have never been able to feel a similar resentment against the palatine or faucial tonsils. I find it difficult to agree with the recommendation that when a general anæsthetic is given for removal of adenoids the palatine tonsils should also be sacrificed as a matter of routine. Some years ago this dissociation was appreciated in a book by Kerr Love,[8] and he repeats the idea more recently.[9] The fact that it has been advisable, in a few cases, to remove tonsils at a second operation does not justify the sacrifice of an apparently innocent tonsil at an adenoid operation.

The development of the palatine tonsils in the fœtus has been clearly described by Losanow,[10] and that of the respiratory tonsil by W. E. Cooke [11]; but the so-called germ centres or secondary follicles are not seen in either the palatine or the respiratory tonsils until after birth, or, in other words, until the infant is exposed to the infections of the outside world. It is to these germ centres (though such centres are not confined to tonsillar lymphadenoid tissue) that considerable attention has been paid by such observers as Heiberg [12] and Hellman. Neither type of tonsil is a superficial lymphatic gland in the general sense. The palatine tonsil, once thought to possess afferent lymph vessels, has been shown by Amersbach and Schlemmer not to possess them. Its lymphatic capillary system drains centripetally only, and is otherwise a closed system.

Other groups of lymphadenoid tissue may assume considerable size in different parts of the mucosa of the pharynx; such masses are often to be seen on the post-pharyngeal wall after the tonsils (faucial tonsils) and adenoids (respiratory tonsil) have been removed, although the granules from which they have arisen may previously have been invisible to the naked eye. Though similar in most respects, and both showing crypts or folds, the palatine and faucial tonsils differ in their covering epithelium, particularly as seen in the crypts. In the respiratory tonsil this epithelium is ciliated. In the palatine tonsil, mucous glands are never seen to open into the crypts, which are normally emptied by the movements of deglutition at the faucial pillars; whereas in the respiratory tonsil mucous glands open into the depths of the crypts, pouring out secretion which cleanses them and provides mucus to cover the surface of the organ. This is emphasised by Pierce Sturm,[13] and is well shown in the microphotographs of Cooke [11] and C. F. Hill.

THE FUNCTION OF THE LYMPHADENOID TISSUE OF THE PHARYNX

If we go back as far as 1880 we find the idea, now rejected, that the faucial tonsils were concerned somehow with digestion. Some have considered them to be almost useless—a view with which we cannot now agree; others have suggested that they give architectural finish to the faucial arches and perhaps act as pulleys to the musculature of the anterior and posterior pillars. These mechanical ideas are reasonably sound, but there is growing recognition that these organs, in conjunction with the other lymphadenoid tissue in the pharynx, are concerned with protection against microbic invasion.

In the germ centres, which he calls secondary follicles, Hellmann observes a reaction to invasion. Heiberg finds lymphocytes to be destroyed in this site—not produced, as Fleming thought; and Viggo Schmidt,[14] studying the immunising properties of leucocytes, postulates the formation of endolysins in the destruction process. Waldapfel and Grossmann, of Vienna,[15] described the histopathology of tonsils removed during acute tonsillitis, and found polymorphonuclear leucocytes with intracellular cocci in the germ centres; normally, neither are to be found in the lymph follicle. These observers point out that acute tonsillitis, though appearing in several clinical forms, is not a catarrhal infection but a disease of the tonsil as a whole. The phlegmonous appearance is an outstanding feature of the pathological picture; the pharyngeal tonsil may behave in a similar way, or may not be involved in the process at the same time. They believe that their findings confirm Hellman's idea of the lymphatic tissue acting as a protective wall against bacterial and toxic products invading the organism.

An endocrine function was attributed to the tonsils by Voss, who thought they retarded growth; but as Albrecht and Kahler point out, later work failed to support this. Halasz,[16] experimenting with rabbits, has tried, more recently, to revive this idea, but Reichmann [17] finds himself unable to support it.

Yoffey,[18] discussing the lymphocytes, says :—

> "It is quite likely that the lymphocytes are concerned with the active growth processes of childhood and that the lymphoid tissues act as a storehouse of primitive wandering mesenchyme cells to supply the various tissues as they are needed."

This recalls the view expressed by Syk [19] that the lymphocyte [18] is capable of wandering into the pharyngeal lining tissue and performing the nutrition-bearing function of the threpocyte of Carrel [20]; Schmidt found that the number of lymphocytes in the peripheral blood count could be influenced by massaging the tonsils. Finally, Halasz claims that he can relieve attacks of pharyngitis in individuals whose tonsils have been removed (pharyngitis tonsillopriva of Pollatschec), or in old people whose lymphadenoid tissue has atrophied, by injections of albumin-free tonsil extract.

In considering the functions of the lymphadenoid tissue of the upper respiratory tract Barnes [21] has warned us against flights of scientific imagination which are difficult to refute; but the subject is surrounded with difficulties. Schmidt recalls that, at a discussion on the tonsil problem at Kessingen in May, 1923, the debate came to an end with the statement of Schlemmer's hypothesis: The lymphatic

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[*] Kaiser states that : "During the last 15 years the frequency of tonsillectomy has greatly increased. It became a matter of common occurrence to have a parent or neighbour rather than the physician decide whether the tonsils should be removed."

tissue forms an integrant part of the pharyngeal tissue without any separate functions.

CHRONIC TONSILLITIS

When suspicion gathers around the faucial tonsils as a possible source of local or general disease what local evidence can be collected against them? Hypertrophy is by no means evidence of disease in itself. It may, however, give rise to mechanical inconvenience even to the extent of marring speech, interfering with breathing or swallowing, or preventing proper ventilation of the Eustachian orifices by hypertrophy extending into the soft palate. If these sequelæ can be proved to have occurred then the tonsil is mechanically pathological. Some tonsils are so much pedunculated as to appear enlarged and are then frequently, though unjustifiably, condemned on sight. A condition of hypertrophy may be in itself a measure of functional ability, but a condition of great hypertrophy may become a pathological state, in so far as the organ becomes liable to acute attacks of inflammation. Heiberg,[12] calling attention to the process of so-called necrobiosis in the germ centres, saw the possibility of the process being carried to excess, with increase in size of the organ and lengthening of the crypts—a vicious circle leading to vulnerability and disease. Hypertrophy in excess, therefore, may become a pathological state apart from mechanical considerations. Marked diminution in size may also point to a pathological state; it may mean fibrosis, the result of past infections, a greater proportional diminution of the lymphoid tissue and loss of function. Halasz regards this as a state of negative allergy; but it may also be looked upon as the neutral state described in Schmidt's experiments on tonsil massage.

The plica supratonsillaris and the plica pretonsillaris may be sources of embarrassment to a tonsil, causing a sort of phimosis at the outlets of their respective recesses; and Kahler draws attention to the transverse bar or plica of Grünwald. The tonsillar recesses may become sites of stagnation, and therefore the starting points of invasion. We know that we can relieve patients from localised inflammation and save them from immediate tonsillectomy by gently releasing detritus from the pretonsillar recess. It has even been suggested that circumcision of this plica pretonsillaris might be practised. Fibrous scars of the tonsil surface indicate past inflammation, but should not be confused with the plica transversus which appears to divide the tonsil into an upper and lower part.

Much attention has been given to the presence of crypt material as evidence of chronic disease, and in the small proportion of cases where it consists of actual pus—laden with a higher percentage of leucocytes—disease can certainly be diagnosed. Crypt material or tonsil detritus, as a rule, however, may be no more harmful than the epithelial collections to be found under the finger-nail. Such collections should not be confused with the horny plugs of tonsillar keratosis. To reach agreement on the healthy or pathological state of a tonsil is a delicate matter, and tonsillar keratosis may lead to the severance of *diplomatic* relations with a colleague who may not have attempted to remove those surprisingly adherent horny particles.

Berggren and Hellman[22] have published an elaborate paper of their research on chronic tonsillitis.† They quote Hajek's remark that "the most certain proof of a chronic tonsillitis is always the occurrence *of repeated acute attacks.*" Berggren and Hellman conclude that "chronic tonsillitis with free intervals" is nothing but the frequent recurrence of inflammatory attacks in tonsils whose physiological capacity has been subjected to severe strain. Even the first attack of acute angina therefore may be the real starting point of a chronic process, which may show little in the way of definite clinical signs or symptoms in the tonsil itself, but may form the basis of a general infective condition.

It is not necessary to conclude, however, that occasional acute attacks of tonsillitis in a child will result in permanent crippling of the organ. It is not easy to decide how many such attacks he may be allowed before becoming a candidate for tonsillectomy, but it certainly happens that children pass through such phases and then cease to be troubled by further attacks. According to Hajek's teaching, if a person has three attacks of follicular tonsillitis, with joint pains, in the course of a year or two, the tonsils should come out. Reddening of the faucial pillars does not necessarily signify chronic tonsillitis; it is frequently seen in healthy persons after meals.

Chevalier Jackson in his contribution to the text-book of Jackson and Coates exhibits two coloured illustrations of reddening—which, however, may be pathological; one shows a limited margin of redness, indicating that tonsillectomy will be followed by cure of associated remote disease; *in the other the reddening is more diffuse,* does not show a limited margin, and is the result of a general pathological condition which will remain unaltered if operation is carried out.

Œdematous infiltration of the tonsil with associated redness and swelling of the palatal arches is a definite indication of disease. Glandular enlargement in the tonsillar chain in the neck may be commonly felt; but the diagnosis of a harmful enlargement may vary with the personal opinion of the observer, especially when the patient is a child. Conservative treatment is therefore advisable. But when a frank glandular enlargement is noticed to persist, tonsillectomy is indicated, no matter what may be the appearances of the tonsil itself. Kaiser describes cervical adenitis in children as a clinical entity, deserving of the name, when glands actually become visible as a result of enlargement. Howarth and Gloyne have shown that such enlargement of glands is not necessarily tuberculous; tubercle is probably a late infection. The value of a blood examination in certain cases must not be lost sight of. I have had some fortunate escapes from performing the operation of tonsillectomy in cases of lymphatic leukæmia.

Opinions appear to vary as regards the value of *bacteriological examination of material taken* from the surface of the tonsils or from the crypts, either with the platinum loop or by puncture (Ramsay and Pierce). We may look for help to the pathogen selective method, as practised in this country by Cronin Lowe; this method is similar to that used by Solis Cohen in America, and bears a close relationship to the virulence test of Rouge modified by Phillip. Halasz, however, considers the discovery of types of organisms known to produce serious disease as evidence of a pathological condition of the tonsil. Some *bacteriologists are not willing to accept* the view that Cronin Lowe's method would settle this problem in remote disease of suspected tonsillar origin.

THE TONSIL AS A FACTOR IN REMOTE DISEASE

Lillie and Lyons in America, writing at a time when the responsibility of the tonsil in rheumatic affections was thought to be considerable, recommended complete removal of the tonsil with plica in every frank case of myositis and arthritis. They expected 89 per cent. of improvements. A history of tonsillitis, though valuable, was not considered to be necessary. Crowe, Watkins and Rotholz, more conservative, did not advise tonsillectomy in stubborn cases of rheumatoid arthritis, but claimed favourable results from the operation in (1) infective arthritis with peri-articular signs, (2) myalgia, and (3) acute polyarthritis (rheumatic fever). Such indictments against the tonsil as a focus of infection in arthritis led Gording and Bjorn-Hansen [23] to seek further information from the blood picture for evidence of an infective process. A. L. Bloomfield remarks, in a late edition of Musser's text-book of medicine :—

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† An abstract by Mr. Thomas Guthrie appeared in the Jour. Laryngol., 1930, xlv., 590.

> With regard to remote disorders such as arthritis or nephritis the evidence is not conclusive, but such statistics as are available bring no proof that tonsillectomy either prevents or has any special beneficial effect on remote or constitutional disease. In brief, the present practice of indiscriminate removal of tonsils on the slightest excuse or for no reason at all is certainly to be decried. The subject is an important one, since the operation, while not usually difficult, has its hazards as well as its economic complications. Every physician should give the matter serious thought, and one may fairly add "let your conscience be your guide."

Kaiser's work among the children of Rochester, U.S.A., illustrates the need for such serious thought on the subject.

RESULTS OF THE ADENOID OPERATION

We know that the results of operative removal of the respiratory tonsil, in properly selected cases, are brilliant. This applies especially to cases of naso-pharyngeal stagnation, with inadequate nasal ventilation and its evil consequences. It is time, however, to dispel the popular idea that when such an operation gives poor results the adenoid mass has returned and must be removed again. If the operation has been properly carried out such a recurrence is rare indeed. The development of a residual granular naso-pharyngitis should not call for the curette or the adenectome, but for an inquiry into the general condition of the child, and particularly into the condition of the nose; in treating the so-called nasal catarrhs of children, it should be remembered that vasomotor rhinitis is common ; if surgical treatment is needed the application of the galvano-cautery point to the relaxed and waterlogged inferior turbinates gives hopeful results. We should look also for hypertrophic rhinitis and deflection of the nasal septum, but should expect to discover a manifest sinusitis more rarely.

Cases of ear disease with intermittent deafness do very well, particularly when they occur in young children. Keen [24] and Kaiser both draw attention to this. In frank inflammatory disease of the middle-ear cleft, however, disappointment after the adenoid operation must be accepted with some resignation, particularly in older children. We need have few illusions on this point now. The hereditary factor too comes out unpleasantly often. It is a delicate matter to decide whether the palatine tonsil should be removed or not, and equal care must be exercised when the size and state of the respiratory tonsil of Luscha is under review. The presence of a respiratory tonsil within normal limits may be more protective to the middle-ear cleft than none at all, particularly when we have to consider the more serious attacks of acute middle-ear disease and their complications.

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ANCYLOSTOMA ANÆMIA AND ITS TREATMENT BY IRON

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ANCYLOSTOMA anæmia is common in Egypt. The cause of the anæmia in this disease being easily removable, the rapidity of blood regeneration can consequently be observed and the response to different drugs in similar groups of cases compared. We therefore considered that this disease would furnish a suitable type of case for the trial of various drugs in the cure of the group of secondary anæmias. Recently we have had the opportunity of carefully studying a group of more than a hundred of these cases.

Ancylostoma anæmia is a hypochromic, microcytic anæmia. In severe cases the number of the red blood-cells per c.mm. is markedly diminished, while the hæmoglobin is reduced to a much greater extent proportionately. In this series of cases the average red cell count was 2,900,000, the hæmoglobin 27·8 per cent., and the colour-index 0·47. The lowest red cell count was 1,400,000, while the hæmoglobin in some cases was as low as 10 per cent. and the colour-index reached 0·15.

Boycott,[1] using the carbon monoxide method of determining the total volume of blood, concluded that in these cases the percentage content does not correspond to the actual deficiency, owing to a considerable increase in the plasma and total volume of the blood ; the red cells and hæmoglobin are in a way diluted, so that the total diminution in hæmoglobin is less than would be suggested by a consideration of the hæmoglobin percentage alone, while the total number of red cells is frequently higher than normal, this being compensated for by a secondary fall in the colour-index.

On the whole, as seen from Table I., there is little shortage of hæmoglobin, and this would probably account for the mildness of the symptoms frequently associated with the severest grades of anæmia—for example, 10 per cent. of hæmoglobin, as estimated by the Sahli hæmoglobinometer—especially if compared with cases of pernicious anæmia of the same intensity of hæmoglobin deficiency. It is an everyday experience to see cases with 20 per cent. of hæmoglobin complaining only of slight dyspepsia or pains in the knees on walking. The fullness of these patients' soft tissues usually gives them a rather plump face and this, associated with their pallor and the blue discoloration of their conjunctivæ, produces a characteristic picture from which ancylostomiasis can be diagnosed almost with certainty even at a distance.

TABLE I.—*After Boycott* (*Milroy Lectures, 1911*)

	Hb. %	Total Hb. in g.	Blood volume.	Relative number of red cells in whole blood.
Normal ..	100	400	3000	100
Anc. 1 ..	44	311	5160	102
„ 2 ..	47	357	5520	106
	41	331	5880	
„ 3 ..	49	316	4620	128

Not infrequently actual œdema is present in sufficient amounts to give quite definite pitting on pressure, especially about the ankles. In some of these œdematous cases where examination of the blood proteins was carried out, it was found that the total protein and the albumin percentage were diminished—sometimes down to 5 and 2·6 per cent. respectively; but this was not constant. Occasionally a marked swelling in the region of the parotids is very apparent, but its exact ætiology is uncertain. In two cases marked spoon-shaped nails were observed, without associated achlorhydria.

In the cases investigated by us the van den Bergh reaction has always been negative, so that there can be no question of hæmolysis; also the reticulocytes have always been less than 1 per cent., usually about 0·5 per cent. at the outset of treatment, normoblasts being found only very exceptionally and then in extremely small numbers. Anisocytosis was common. The average size of the red cells, as estimated by Eve's halometer, was 7·44 μ, varying in different cases from 7·02 μ to 7·66 μ, the normal with this instrument being considered to be 7·6 μ. Not a single case showed the picture of a megalocytic anæmia.

Occult blood was nearly always found in the stools; we could not, however, always exclude other causes for bleeding in the gut apart from the presence of the worms. The lesions produced by the biting apparatus of these worms will almost certainly lead to some ulceration, from which bleeding will continue to take place for some time afterwards. Looss[3] considered that the main food of the parasite was serum and mucosa, any blood being ingested accidentally, and it remains to determine whether the bleeding is sufficient to account for the anæmia. De Langen,[4] carrying out quantitative estimations, has shown that these occult blood reactions are equivalent to 2 or 3 c.cm. of blood per day, a quantity he considers not nearly sufficient to produce such a degree of anæmia, as he failed to cause anæmia in sheep by withdrawing 100 c.cm. of blood weekly. It has, however, been shown by H. S. Wells,[5] working on *Ancylostoma caninum*, that each worm passes 0·84 c.cm. of blood through its digestive tract daily, so that 25 worms would cause a daily loss of about 20 c.cm. If this work be confirmed it would indicate that there is sufficient loss of blood to bring about by itself a severe degree of secondary anæmia.

Whether ancylostoma anæmia is hæmorrhagic or toxic and, if toxic, hypoplastic or hæmolytic, is still a debated point and must for the time being be left an open question. It may be pointed out, however, that in our cases, before treatment, evidence either of hæmolysis or of active regeneration was lacking in the blood and that after treatment had been commenced the blood showed signs of active regeneration—viz., reticulocytosis. A toxin is, however, certainly produced, as shown by the eosinophilia, but this is no proof that it, or a similar body, is the important factor in the production of the anæmia. Hæmolysins have been extracted from the head of the worm but such bodies can be extracted from practically every living organ or tissue. In our cases moderate or high eosinophilia was quite common.

Boycott,[1] in 1903, found that cases with high eosinophilic counts usually had a high total count. He calculated that the increase in the total leucocytes corresponded exactly to the increase in the number of eosinophils, these being added to the normal leucocytes of the blood and any change in the respective percentage of the other cells being merely secondary to the addition of eosinophils. In our cases there was little difference in the total counts, only the group having 20 per cent. or more eosinophils showing any increase (Table II.). There was also little difference in the response to treatment between the cases showing high and those showing low eosinophil counts.

TABLE II

Percentage of cases.	Eosinophils %	Average total leucocytes.
19	20 or more	9943
27	10 to 19	7230
27	5 to 9	7460
27	0 to 4	7528

The maximum recorded was 31 per cent., the average 13½ per cent.

Besides the direct action of the worms, toxic or hæmorrhagic, other factors no doubt contribute to the causation of the anæmia. The diet in our cases has generally been very low for years, meat, according to the patients' statements, being partaken of at most once weekly or sometimes as seldom as twice a year. Almost all patients state that they seldom eat uncooked vegetables, these being usually eaten in very much overcooked forms. The staple articles of diet are maize bread and preserved cheese, a diet obviously deficient in iron and vitamins. Pellagra is a frequent complication; this disease, however, will not be considered here.

Gastric juice analysis very rarely revealed achlorhydria, and it was most commonly found in cases complicated by pellagra. That hydrochloric acid deficiency when present plays a rôle in the causation of the anæmia is probable, the cases showing it, as will be seen later, responding more slowly to iron therapy; absorption is apparently impaired because the pH is higher than 3, instead of the normal 1·4 to 1·6.

An interesting clinical feature of these cases of anæmia was the systolic murmur heard over the pulmonary and mitral areas in the majority of cases. It differed from the usual description given of such hæmic bruits in being frequently very harsh and heard well out towards the axilla. It was sometimes much more marked over the apex than over the base, its character changing with any alteration in the position of the patient. Such a murmur usually disappeared or was considerably diminished in intensity when the anæmia had disappeared under treatment.

TREATMENT

First of all, worms were got rid of by administering carbon tetrachloride at weekly intervals until repeated examination of the stools by the floatation method revealed freedom from ova, and further treatment with carbon tetrachloride failed to produce evacuation of any more worms. Usually three or four doses were required to remove all the worms. Hexyl resorcinol was tried in a number of these cases, and the results, which were not satisfactory, have been reported elsewhere.[6]

In some cases, although no ova were found on stool examination, the anæmia and the appearance of the patient were so typical that carbon tetrachloride was administered, and not infrequently large numbers of worms were expelled. This difficulty in demonstrating ova may be due either to the presence of male worms only or to the failure of worms to find in the host a sufficiently nourishing pabulum to lay eggs. Experimental evidence in favour of the latter hypothesis may be found in the observation of Looss[7] who, after infecting himself, found that when his diet was reduced the development of larvæ from his stools was poorer than when milk or cheese was added. This effect may, however, be secondary to a change in the flora; Fleming and Allison have shown that addition of egg-albumin to a diet increases the number of *B. coli* in the stools, while McCoy[8] has shown how the larvæ thrive on bacteria.

The dietetic factor may also help to explain the very low worm loads found in some of the severest cases, the worms abandoning the host if he becomes very anæmic, and if his diet is very poor. Generally cases with only a moderate anæmia (40 to 60 per cent.) harboured only a few worms (up to 20), while the more severe cases of anæmia were frequently associated with higher loads of worms. As pointed out above, this however was not constant. The maximum number of worms found in our cases was 141.

The majority of the worms having been removed, the drug we proposed to try was administered. The red cells and the hæmoglobin were estimated twice weekly, using the Sahli instrument. This instrument, according to Wintrobe and Miller,[9] gives lower readings than most others. According to their calculations a reading of 100 per cent. with it corresponds to 17·2 g. of hæmoglobin per cent., while with the CO method of Haldane, 100 per cent. corresponds to 13·3 g. per cent. and with the Dare instrument to 13·8 g. per cent., so that when the Dare instrument shows 100 per cent., the Sahli will show 80 per cent. That this number should be taken as the normal in the average adult Egyptian is further confirmed by some estimations we carried out on a series of normal Egyptian adult controls with this apparatus. Out of 60 cases, two-thirds varied from 75 to 85 per cent., with a minimum of 64 and a maximum of 93, the average being 78·8 per cent.

These considerations must be remembered later, when the level reached by the hæmoglobin on different methods of treatment is considered, as a level of 80 per cent. (Sahli) was seldom surpassed, this corresponding to 100 per cent. (Haldane); further, when considering the colour-index, an index of 0·8 (Sahli) will be equivalent to 1·0 (Haldane).

We have tried various iron preparations, given alone or in combination with other drugs. The following have been used:

Oral.—Ferrum redactum, Blaud's pill, ferrous chloride, liver.

Parenteral.—Inj. ferri (B.P. given) intravenously and intramuscularly.

To the oral iron, copper, and manganese, vitamin B in large amounts, liver or thyroid were added in different cases.

ORAL IRON

Ferrum redactum.—This was given in cachets after meals. At first, a number of cases had small doses, 0·3 g. t.d.s., but later these were increased to 2 g. t.d.s. No untoward gastro-intestinal symptoms followed these doses, and the patients did not complain of any gastric discomfort or diarrhœa. It must be remembered, however, that these cases were almost universally constipated on admission, any irritating effect of the drug on the intestine merely being sufficient to neutralise this constipation. In certain non-hospital cases, especially women, this large dose had to be reduced owing to the onset of diarrhœa.

In some cases liver was added to the iron with no apparent improvement in the results, while neo-arseno-benzene (914) in moderate weekly doses of 0·15 to 0·45 g. enhanced the hæmopoietic regeneration and enabled the hæmoglobin to reach higher levels, even in cases with a negative Wassermann reaction.

The rapidity of blood regeneration can be seen in Fig. 1 which shows the results in 70 patients who had 2 g. ferrum redactum t.d.s. The count rose from an average of 2,900,000 red cells and 27 per cent. hæmoglobin to 4,900,000 red cells and 64·3 per cent. in five weeks, and reached an average of 5,500,000 red cells and 75 per cent. hæmoglobin in seven weeks.

Five cases showed achlorhydria and, as seen in the chart, showed a much slower response to treatment, rising from 3,280,000 and 38·5 per cent. to 5,100,000 and 54 per cent. in five weeks, reaching only 5,400,000 and 54·5 per cent. in seven weeks. Eleven patients who had only 0·3 to 0·6 g. of ferrum redactum t.d.s. showed a very poor response to treatment, rising from 3,000,000 red cells and 27 per cent. hæmoglobin to 4,100,000 and 41·6 per cent. The increase in red cells is usually accompanied by a moderate reticulocytosis, in our cases not exceeding 10 per cent. This rise in reticulocytes is slow and prolonged, lasting roughly from ten days to two weeks. Fig 7 illustrates the same results in another way. It shows the gain in hæmoglobin, under various forms of treatment.

In a number of cases which became stationary at about 60–70 per cent. hæmoglobin, copper and manganese were added to the iron, according to the following formula: ferr. redact. 2·0 g., pot. permang. 0·025 g., copper sulph. 0·005 g. Ft. cachet 1 t.d.s.

Some were given vitamin B, in the form either of marmite 2 g. t.d.s. or of fresh brewer's yeast 60 g., daily. In others 250 g. of liver by mouth daily, or thyroid extract, were added. On the whole, copper and manganese enabled higher levels to be reached, but, as these patients stayed longer in hospital and were still having the iron all the time, it is possible that this rise was due to the iron alone. Marmite was usually ineffective, while thyroid extract produced an initial slight fall of 5 to 10 per cent. in the hæmoglobin, followed later by a small rise above the former level.

Blaud's pill was given to ten patients in doses of grs. 150 daily, in freshly prepared, easily crushed tablets. No toxic symptoms were observed from these massive doses. The patients treated by this preparation were mostly cases of pellagra with ancylostoma anæmia and consequently, as is usual in such cases, a large proportion of them suffered from achlorhydria, only one of them having any free hydrochloric acid. The results obtained with this method of treatment showed no appreciable difference from a similar group of achlorhydric cases on reduced iron, the red cells rising from 2,800,000 to 4,300,000 and the hæmoglobin from 35·6 to 62·5 per cent. in six weeks, as can be seen from Fig. 1.

Ferrous chloride.—Four cases had ferrous chloride in a mixture, in doses of 0·3 g. daily. The results were very poor, the red cells and hæmoglobin rising from 3,000,000 and 33 per cent. to 3,950,000 and 47 per cent. in four weeks. In one case, shown in Fig. 2, reduced iron produced a quick response after ferrous chloride had failed to do so in four weeks.

Liver was administered alone in nine cases, in doses of 250 g. a day of fresh lightly cooked liver. The hæmoglobin showed a very poor response, rising from 16 to 37 per cent. in six weeks, this being no more rapid regeneration than would have resulted from mere removal of the worms without any special line of treatment, while the red cells showed a rise from 1,800,000 up to 5,000,000 in a corresponding time (Fig. 3).

In four cases no iron was given after the expulsion of the worms, in order to watch the progress of the case. Practically no improvement was seen after about four weeks' treatment (Fig. 4). If to these four cases we added the eleven cases which had only small doses of iron and which showed a very poor response, it becomes clear that iron in large doses is necessary to bring about a rapid recovery. These results agree with those of other observers (Toshizo Kobayashi[10]). In another eight cases ferrum redactum 2 g. t.d.s. was given, while no attempt was made to evacuate the worms (Fig. 1). Here a very rapid improvement in the blood condition took place, the hæmoglobin reaching 66·7 per cent. in five weeks; this result is in agreement with Keefer and Yang's findings.[11]

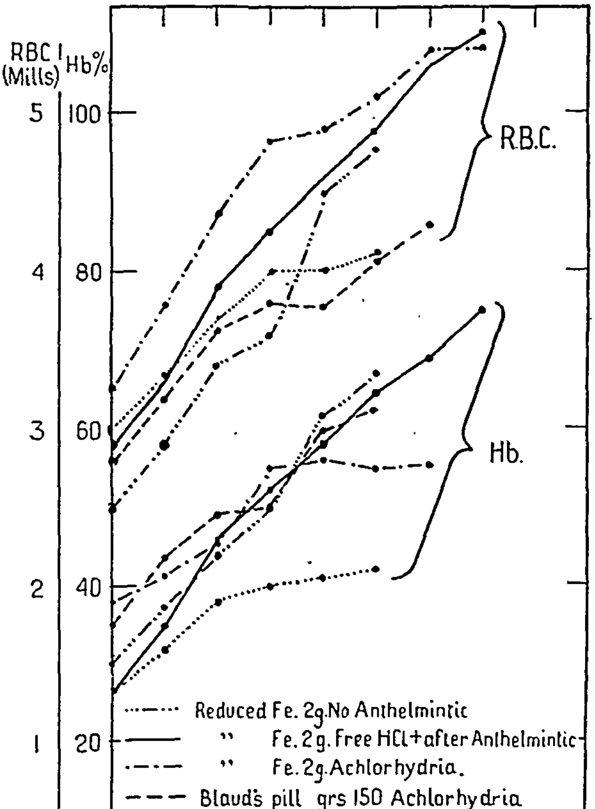

FIG. 1.—Showing response to various forms of treatment, and achlorhydria.

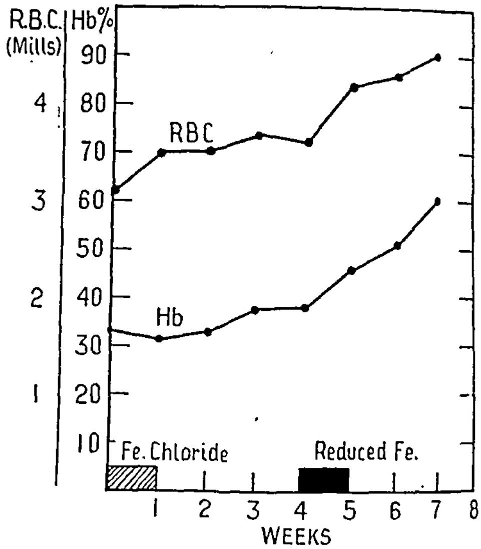

FIG. 2.—Showing weak response to ferrous chloride 0·3 g. daily for four weeks, followed by quick response to reduced iron.

The conclusion can therefore be drawn that large doses of iron can correct ancylostoma anæmia even when the patient is still harbouring the worms, but the probability is that such cases, if the iron were discontinued, would relapse to their former condition.

IRON BY INJECTION

By the kindness of Dr. R. S. A. Heathcote, professor of pharmacology in the faculty of medicine of Cairo, we were able to observe the effect of injecting large doses of iron intravenously in rabbits. The injectio ferri (B.P.) was used. It was first added to serum in vitro, no precipitation resulting. It was next injected undiluted into the ear veins of rabbits with no ill-effect even when 100 mg. of iron citrate were employed. Only one of the rabbits collapsed immediately after the injection, but it rapidly recovered and showed no subsequent ill-effect. In our patients we first used it intramuscularly. This method was exceedingly painful, the pain lasting very long after the injection had been completed; we therefore added 1 c.cm. of a 2 per cent. novocain solution to the contents of the ampoule at the time of the injection, and with this addition only very slight pain was experienced after the administration, and this rapidly disappeared.

In another group of patients we injected the drug into the vein daily. Some complained of an immediate feeling of flushing, giddiness, and nausea, but this was very transient and did not occur after the third injection. The ordinary B.P. injectio ferri was used at first, but as the results were poor this was considered to contain an insufficient amount of iron and another preparation was employed containing 50 mg. per c.cm., and of this preparation 1 or 2 c.cm. were given.

On the whole, iron by injection has produced only a very small effect, if any, on these anæmias. Six patients had intravenous injections in doses of 100 mg. daily of iron and ammonium citrate and showed a rise from 2,660,000 red cells to 3,000,000 and from 24·5 per cent. hæmoglobin to 33·5 per cent. in four weeks (Fig. 5). The effect of the intramuscular injections was not very different on the whole; the d cells rose from 2,900,000 to 3,900,000 and the emoglobin from 27 to 49 per cent. in five weeks, is being the average of eight cases who had 100 mg. day (Fig. 5).

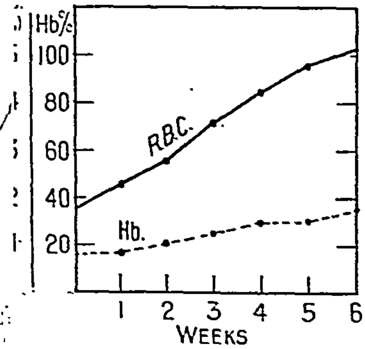

FIG. 3.—Effect of whole liver 250 g. daily on hæmoglobin and red blood-cells.

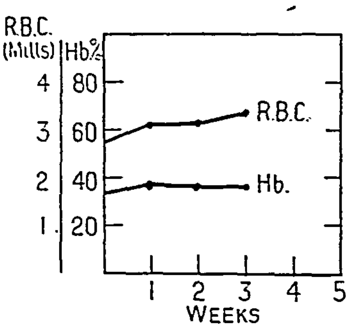

FIG. 4.—Showing no improvement, after removal of worms, in patients who had no iron.

On the other hand, taking the cases individually, we found that while the effect taken as a whole is nearly the same, some cases reacted very quickly and markedly to intramuscular medication, while this effect was never observed in those who had the iron intravenously Fig. 6 shows the red cells and hæmoglobin of a patient who was given 50 mg. of iron and ammonium citrate intravenously. The red cells and hæmoglobin, which on admission were 1,300,000 and 11 per cent. respectively, were still 1,700,000 and 24 per cent. after three weeks, although active anthelminthic medication had been given. Intravenous was then replaced by intramuscular injections of the same dose and his red cells and hæmoglobin showed a quick rise to 3,200,000 and 47 per cent. after four weeks. At this point the dose of iron and ammonium citrate given was doubled and the red cells rose in one week to 4,100,000 and the hæmoglobin to 60 per cent. (Fig. 7).

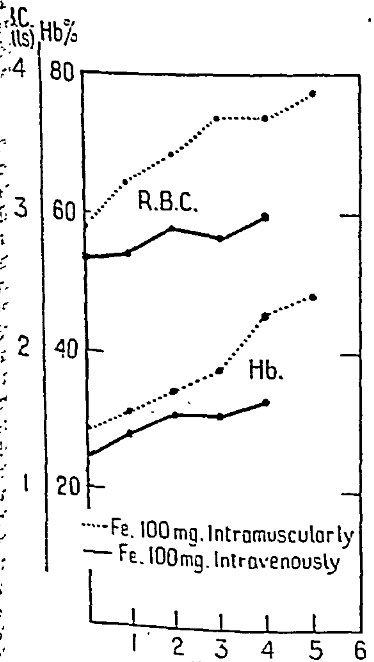

FIG. 5.—Effect of 100 mg. iron and ammonium citrate intramuscularly and intravenously, to same scale as Fig. 1.

This shows that, while iron by injection is as a whole of little use, the intramuscular route is more effective in some cases and in appropriate doses, and may produce quite an appreciable effect. In no case was there any ill-effect on the kidneys or any other organs during this parenteral administration.

CONCLUSIONS

1. Ancylostoma anæmia is considered to be a suitable anæmia in which to observe blood regeneration under different treatment after removal of the cause.

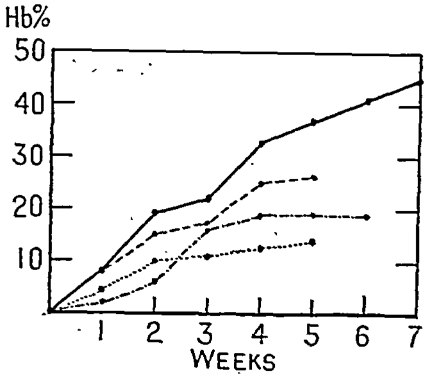

FIG. 7.—Comparative percentage rise of hæmoglobin above original level as compared with Fig. 1.

2. Reticulocytes were present in very small numbers before treatment. A rise to about 10 per cent. occurred under iron treatment. Eosinophilia up to 20 per cent. or more was noticed in 19 per cent. of cases, from 10–19 per cent. in another 27 per cent. of cases, from 5–9 per cent. in 27 per cent., and below 5 per cent. in 27 per cent. The maximum was 31 per cent., and the average 13⅓ per cent. No relation was found between the eosinophilia and the total leucocytic count.

3. The hæmoglobin in the average normal Egyptian adult is considered to be about 80 per cent., using the Sahli hæmometer.

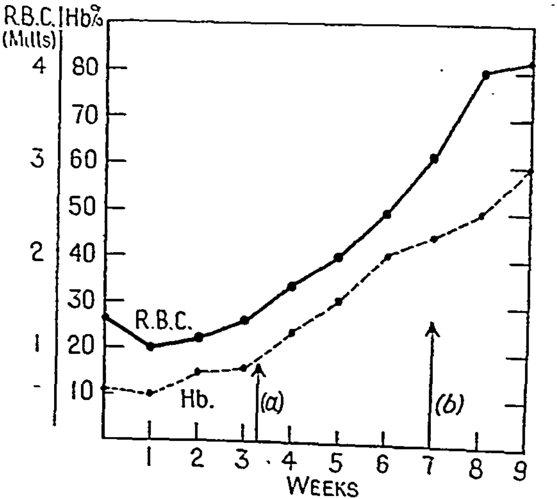

FIG. 6.—Showing effect of change from intravenous to intramuscular iron injections at arrow (a) and of doubling the dose from 50 to 100 mg. intramuscularly at (b).

4. The response of the red cells and hæmoglobin to reduced iron, Blaud's pill, and ferrous chloride by mouth, together with the effect of addition of liver, yeast, marmite, copper, and manganese in different cases is described and illustrated by charts. It is shown that doses of iron can correct ancylostoma anæmia even when the patient is still harbouring the worms, but that removal of the worms alone produces little or no change on the blood picture.

5. Observations on intravenous injections of the

injectio ferri (B.P.) in rabbits in very high doses showed no toxic manifestations.

6. The effect of 100 mg. daily of injectio ferri, i.e., three times the official dose, is discussed. The results are considered not to be satisfactory, although in certain cases intramuscular administration was sometimes effective. A case is described where intramuscular injections produced a good response after intravenous injections for three weeks had failed to do so.

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SUBARACHNOID HÆMORRHAGE

IN GENERAL PRACTICE*

BY J. N. GALE, M.D. Sheff.

SUBARACHNOID hæmorrhage must be recognised in the patient's home. Unlike many other neurological conditions it does not allow of the patient being sent into hospital with perfect safety to await examination. A missed diagnosis, therefore, may easily lead to death; whereas with correct treatment in a suitable case complete recovery may be expected, since the brain substance has not been ploughed up and damaged as it is in an intracerebral hæmorrhage.

Spontaneous subarachnoid hæmorrhage refers to cases of hæmorrhage in the space between the arachnoid and the pia mater which are not caused by violence in the ordinary sense of the word. The cases fall roughly into two groups: the younger, in which it is usually due to a congenital aneurysm or a defect in the vessel wall; and the older, in which it is due to arterial disease or degeneration.

DIAGNOSIS

In general practice it is always convenient to have a condensed version of the signs and symptoms of the less severe cases in one's mind, and my own mental picture is as follows. The patient is suddenly seized with an intense headache and feels as if something has snapped in the head. He reels about and may become unconscious for a short time. He always has a severe headache over the occipital or more rarely the frontal area, with stiffness of the neck and usually photophobia. At the risk of being dogmatic I venture to say the headache of instantaneous onset with transient giddiness or unconsciousness, and stiffness of the neck and photophobia demand lumbar puncture as certainly as hæmaturia demands a cystoscopy. I may mention also that photophobia has been present in every case with which I have been associated and in every attack in a patient who has had five attacks. Although Barber and Taylor[1] and Lescher[2] have all noted this symptom previously, there is no mention of it in the classical monograph of Symonds,[3] and since it seems to depend on the irritation of the extravasated blood, as does the stiffness of the neck, it appears reasonable to expect to find it in nearly every case.

Other signs which seem to be due to the *irritation of the extravasated blood* are *Kernig's sign, pains in the body* and limbs due to stimulation of the nerve-roots, massive albuminuria due to irritation of the centre in the floor of the fourth ventricle—and not to any renal lesion—and a temperature of 99° to 100° F. This temperature is similar to that seen in cases of ruptured ectopic gestation and is likewise due to the effect of the extravasated blood.

The *occipital headache* is probably due to the increased intracranial pressure and is usually relieved immediately by a lumbar puncture. The other symptoms of increased pressure such as cerebral irritation may be followed by coma, and death may supervene.

Korsakoff's syndrome is present in most cases in greater or less degree. Although this syndrome is also present in alcoholic polyneuritis, infective conditions of the brain, in progressive paralysis, senile dementia, and cerebral contusions, it has not, I believe, been observed in intracerebral hæmorrhage. It may be pointed out that where the prognosis in many of these conditions is bad, in subarachnoid hæmorrhage it is relatively good.

Papillœdema and *hæmorrhages in the fundus* are recorded in a number of cases, and Doubler and Marlow[4] have cut transverse and longitudinal sections of the optic nerve which showed that the blood has forced its way along the optic nerve sheath into the eyeball, which may account for the pain in the eye of which some patients complain. In my own cases the discs have been normal, though photophobia and reddening of the conjunctiva were marked.

These signs and symptoms only add weight to the definite indication for lumbar puncture given by the headache of instantaneous onset, stiffness of the neck, and photophobia, and it is usually not wise to waste time by looking for them until after the lumbar puncture, since the latter will complete the information necessary for diagnosis, besides relieving the patient's headache. The cerebro-spinal fluid must be received into two (or preferably three) sterile test-tubes, since an accidental injury to a blood-vessel during the puncture may cause blood in the first test-tube only, whereas in subarachnoid hæmorrhage it is present in all of them in the same proportion. The colour may vary from a pinkish tinge to a pure blood colour. The blood is soon broken down and after a time the original colour may yield to a golden yellow or brownish tinge.

A large and rapidly fatal subarachnoid hæmorrhage is indistinguishable except at autopsy from a cerebral hæmorrhage which has ruptured into the ventricles or externally into the subarachnoid space. The history of instantaneous onset of the headache, when it can be obtained, is very helpful. The transient unconsciousness with pain, stiffness of the neck, and photophobia, combined with the detailed examination of the cerebro-spinal fluid, usually settles the diagnosis immediately and will exclude conditions such as meningitis and polio-encephalitis. In hæmorrhagic encephalitis lethargica the history is different, and the temperature is usually higher and more sustained; the absence of abdominal reflexes and the ocular symptoms help to differentiate the condition and the subsequent course is not the same.

PROGNOSIS

Excluding the cases where the hole in the artery is large and the patient dies in a few hours, the prognosis is very different in the older group due to arterio-sclerosis and in the younger group due to congenital defect or aneurysm, the mortality being nearly twice as high in the older group. From what have been able to read it seems that the importance of blood pressure in prognosis has been strangely neglected. While it is not possible to observe the condition of the cerebral arteries during life, it is possible to obtain with ease some measure of the strain to which they are subjected in the living subject. The blood pressure will give a definite answer to one-half of the problem of prognosis. Added to this we know already that in cases of spontaneous subarachnoid hæmorrhage the vessel wall is diseased or defective in some way, and this gives the blood pressure an added importance in prognosis and treatment. In most of the younger group of cases there is no permanent elevation of the blood pressure, and the hæmorrhage is due to some defect in the vessel wall or to a tiny aneurysm. In this group the immediate prognosis is relatively good, since with proper treatment and avoidance of anything which tends to raise the blood pressure the patient usually gets well; there is a great tendency to recurrence, as many as five or six attacks having been reported without a fatal termination. It is usually advisable to have a Wassermann test. Hall [5] has reported hæmorrhage from syphilitic arteritis in a man of 28.

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* Based on a paper read before the Derby Medical Society.

In the older group due to arterial degeneration, with or without increased blood pressure, the prognosis is not so good, since the fragility of the vessel wall is usually progressive and the raised blood pressure throws a severe strain on a vessel which is gradually getting weaker. As a somewhat arbitrary rule it appears from the few cases in which the blood pressure has been recorded that a blood pressure of 200 mm. Hg or over is of very grave significance, although there is no certain safety even if the blood pressure is less, because the vessel wall may be unduly fragile.

TREATMENT

In every case there are certain natural factors which tend to cause a cessation of the hæmorrhage. These are the clotting of the blood at the bleeding point and the rise of pressure in the cerebro-spinal fluid. Treatment should take into consideration four factors: (1) the blood pressure; (2) repair of the vessel wall; (3) pressure of cerebro-spinal fluid; and (4) prevention of further attacks.

Blood pressure.—There is possibly a momentary fall in blood pressure due to collapse of the patient at the moment of onset; but almost immediately there is a reflex increase of pressure in order to maintain the cerebral circulation. If the case is seen soon after onset when the bleeding is probably in progress the patient should be rigidly recumbent, the neck must not be kinked, nor should he have any tight clothing round his neck. The rise of intracranial pressure due to the lightest pressure on the jugular vein of one side, as seen in Queckenstedt's test, is instantaneous and gives a very obvious reason for these directions. After performing diagnostic lumbar puncture and finding the pressure of the cerebro-spinal fluid is not unduly high, it is probably advisable to perform a venesection, if the patient has a high blood pressure. It has been argued that venesection is dangerous owing to the risk of reducing the venous blood pressure in the cerebral veins below the intracranial pressure of the cerebro-spinal fluid, but the necessity for venesection can be judged after consideration of the pressure of the cerebro-spinal fluid and also considering the degree of hyperpiesis. I have myself frequently performed venesection and withdrawn 15–20 ounces of blood in cases of apoplexy without any harmful results, although here also there is the same theoretical objection to an immediate reduction of the blood pressure.

There can, at least, be no doubt that it is supremely important to keep the blood pressure as low as possible during convalescence. To guard against the further attacks which are so likely to follow, it is essential to lessen the strain on the vessel wall which is known to be defective. When diphtheria has attacked the heart it is customary to maintain the patient in a rigidly recumbent attitude for some weeks; and I suppose we all keep our cases of thrombophlebitis in bed for six weeks with the limb at rest. I am confident that it is far more important to keep cases of subarachnoid hæmorrhage in bed and rigidly recumbent for at least six weeks, when the rent in the vessel wall should be firmly healed. Purves-Stewart [6] has suggested ligation of the common carotid artery on one side, but many patients would demand some record of success before submitting to a rather drastic operation, and to me personally their attitude seems not unreasonable.

Repair of vessel wall.—Anything which tends to increase the rate of clotting of the blood will tend to limit the hæmorrhage and prevent further leaking. Since local application is impossible the hæmostatics given by intravenous or intramuscular injection may be tried. There is abundant clinical and experimental evidence to show that Hæmoplastin, Coagulen, and Thromboplastin have an immediate and profound effect in increasing the coagulability of the blood, and they should therefore be injected at the earliest possible moment together with some form of calcium.

Pressure of cerebro-spinal fluid.—Indiscriminate and repeated lumbar puncture is not advisable in the earlier stages, since the sudden lowering of the intracranial pressure has resulted in renewed hæmorrhage and death of the patient. Ingvar, quoted by Symonds,[3] has summarised the position as follows:—

> "In subarachnoid hæmorrhage there are two stages to be observed:—First: When the hæmorrhage is actually proceeding the raised intracranial pressure has a protective value as tending to reduce the rate of leakage and so promote coagulation. In this stage, therefore, though it may be necessary to remove a small amount of fluid for diagnosis, therapeutic drainage is contra-indicated—with one very important exception, which is when the rise of intracranial pressure threatens life. In such cases the risk of death by compression outweighs the risk of further hæmorrhage, and lumbar puncture with free drainage may offer the only hope of saving life. In the earliest stages of subarachnoid hæmorrhage therefore, the indications for therapeutic lumbar puncture are the signs of dangerous increase of intracranial pressure especially if these be progressing. In the second stage, when the bleeding has ceased the pains may undoubtedly be relieved by repeated lumbar puncture. The patient should be lying down, a manometer should be used, and the pressure of the cerebro-spinal fluid should not be allowed to fall below 100 mm."

The figures of 100 mm. seems a rather low level for the pressure of the cerebro-spinal fluid and in many cases so big a drop in pressure will not be needed. In this connexion it is interesting to note the type of headache which one can expect to relieve at once by means of lumbar puncture.

The patients usually complain of pain in the occipital region combined with a feeling of intense pressure or numbness. Sometimes they describe the pressure as feeling "like a block of ice" or "being held in a vice," pointing to the occipital region. This headache is not relieved by anything I have tried, excluding morphia, which relieves it for a time. Some time ago I performed four lumbar punctures in five weeks for headaches of this type with instant relief to all. One case was subarachnoid hæmorrhage, one apoplexy, and two were what I believe to be mild cases of encephalitis lethargica, since they occurred along with six or seven others in the course of a small epidemic in which two patients died.

The occipital headache may, of course, be replaced by a temporary headache of a frontal nature, but the knowledge that the lumbar puncture will relieve the occipital headache is often enough to persuade the patient to submit to the lumbar puncture which will also furnish the physician with such valuable information.

Prevention of further attacks.—As there is a great liability to subsequent attacks which are usually brought on by some temporary elevation of the blood pressure, sudden and violent exertion or emotion should be avoided. Constipation with consequent straining is dangerous, as also is repeated bending down. The blood pressure, if raised, must receive very careful attention with prolonged treatment, and it should be observed at least every month for the first year and every two months for the next two years, or oftener if it shows a tendency to rise.

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PRESBYACUSIS AND ITS TREATMENT

By MACLEOD YEARSLEY, F.R.C.S. Eng.

THAT the infirmities of age include the affliction of deafness has long been common knowledge. Polixenes, when he, in disguise, chides his son for *failing to consult him in the choice of a wife* ("Winter's Tale"), refers to it in

> Is not your father grown incapable
> Of reasonable affairs? Is he not stupid
> With age and altering rheums? Can he speak? Hear?
> Know man from man?

and other allusions to age deafness abound in literature. But presbyacusis has been too long accepted, unquestioning, as the inevitable concomitant of "the sere, the yellow leaf," and few ageing persons know that the condition can be improved and to a great extent prevented.

Senile deafness, or presbyacusis, appears in two varieties, according to whether the degenerative changes occur in the middle or internal ear. The latter may be distinguished as the true presbyacusis, but I doubt whether the degenerative process in the middle ear is not always present in some degree. The changes in the internal ear have been considered to be due to a degeneration of the cochlear ganglion cells and the hair cells of the organ of Corti, although Mayer held that the cause lay in an "ossification" of the basilar membrane. Pathological investigations, however, are practically non-existent—at least I have met with none, and a confrère to whom I applied has found the literature equally sterile. There is one remarkable and, to my mind significant, case, published by L. Katz (*Arch. f. Ohrenheilk.*, May, 1906), of what that observer considered to be an instance of otosclerosis in a cat. The animal died at the extreme feline age of 23 years, having gradually become deaf during the last years of its life. Katz found rarefying osteitis of the bone surrounding the labyrinth, with partial degeneration and atrophy of the cochlear nerve and organ of Corti. Since the stapes was not ankylosed and the entire annular ligament was intact, otosclerosis is negatived, and the changes were much more probably due to age.

Systematic pathological research into the condition of both middle and internal ears of elderly and aged people is greatly needed. The very nature of the deafness ensures a plentiful supply of the necessary material.

The age at which presbyacusis first shows itself is usually between 55 and 65, but in all probability it commences at about 50, sometimes even earlier. Like all other forms of nerve deafness, it is characterised by a lowering of the upper tone limit of hearing and a shortening of the bone conduction; probably the former precedes the latter. It would appear that, seeing the little use we make of the hearing acuity for very high tones in modern civilisation, it is these extreme upper notes that would be the first to go, and this is borne out by experience. Bezold, in 1894, examined the hearing in 200 ears of patients over 50 years of age. He found that in the decades following that from the 50th to the 60th years there is not only a successive decrease in the number of those with nearly normal hearing, but there is also a successive increase in the degree of deafness. About the same period, Zwaardemaker deduced from his own investigations a *presbyacusis* law, as follows:

(1) The compass of the human hearing contracts half an octave at its upper limit to the period of advanced old age. The average is a major fourth, the maximum being a major fifth.

(2) During advanced age proper, the contraction of the scale increases.

(3) The upper limit is in youth at *e*7, in advanced age at *a*6 (average values). The extreme lower limit for normal hearing in old people is *g*6.

About ten years later Pflimlin examined 140 cases over 60 years of age in the Freiburg ear clinic, and found the most frequent condition in advanced age to be nerve deafness, or an affection of the labyrinth, perception for high tones suffering most, and bone conduction being considerably reduced. He considered that Zwaardemaker's law holds good for 60 years and over, and that a part of the cases of deafness may be regarded as an increase of physiological presbyacusis, whilst a relatively frequent cause of deafness in advanced age is fixation of the stapes. In this latter statement I am of opinion that Pflimlin was confusing true presbyacusis with deafness due to changes in the middle ear, probably of arthritic nature, and due to the effect of toxæmia, most likely of intestinal origin. In a work upon "Otosclerosis" recently published, I have suggested a serial connexion between certain forms of congenital deaf-birth, otosclerosis, certain anomalous cases of insidious chronic deafness occurring in middle age, and true presbyacusis, and if this connexion proves to be a definitely established fact it will open up a new field in the treatment of chronic and progressive forms of deafness. Unfortunately, I repeat, research is wanting in the pathological anatomy of presbyacusis. One thing is, however, very significant—the association between presbyacusis and intestinal toxæmia. My experience of the past 35 years suggests that if people paid more attention to what they ate and drank, and to the necessity of regular evacuations of the bowels (to the number of two a day), they would delay their degenerative processes and preserve their hearing much longer. It is certain that unless old people with early presbyacusis pull themselves up and take more care of their digestive apparatus from the points of view of a more appropriate diet and less consumption of what are called, with doubtful veracity, the "good things of life," their commencing deafness will assuredly go from bad to worse. This s probably why the treatment of presbyacusis is considered as unsatisfactory and its prognosis usually pronounced to be hopeless. Until about seven years ago, my advice to persons suffering from true presbyacusis was directed to certain radical alterations as to mode of life and the avoidance of too much local treatment, and, in a large proportion of cases, the advice proved unpalatable. But an intimate acquaintance with the electrophonoïde method of Zünd-Burguet in the treatment of other forms of deafness led me to try it in presbyacusis. Since then I have used it in 31 cases with success, especially in the earlier stages of the deafness. The accompanying Table affords a brief record of these cases as to sex, age, duration of deafness, and the state of the hearing for the voice, spoken or whispered, before and after treatment, the distance being given in inches. These cases speak for themselves. Tuning-fork tests are not given, because, for practical purposes, improvement in hearing for the voice in conversation and social intercourse is the aim with which these patients sought treatment. Four of them stated that if they could hear the calls at bridge better they would be perfectly satisfied. In one case the improvement caused a domestic upheaval, as the patient began to hear disparaging things said about him by his family at table.

No.	Sex.	Age.	Duration of deafness.	Hearing before and after treatment.	
				Before.	After.
1	M.	60	2 years.	84	168
2	F.	71	3 ,,	W. 15	W. 180
3	F.	73	5 ,,	29	106
4	M.	68	10 ,,	35	69
5	F.	61	5 ,,	120	180
6	F.	61	?	43	180
7	M.	61	5 years.	52	144
8	M.	77	7 ,,	17	60
9*	F.	61	1½ ,,	W. 120	W. 240
10†	M.	49	3 ,,	36	180‡
11	M.	76	10 ,,	36	84
12*	F.	61	1 year.	W. 36	W. 180
13	F.	72	2–3 years.	36	84
14†	M.	56	5 ,,	W. 72	W. 144
15	M.	68	8 ,,	24	120
16	F.	64	?	14	72‡
17	F.	68	5 years.	60	132
18	M.	62	2–3 ,,	60	204
19*	M.	56	1 year.	W. 84	W. 240
20	F.	70	?	120	204
21	F.	66	10 years.	36	144
22	M.	66	6 ,,	120	144
23	M.	75	10 ,,	84	240
24	F.	68	10 ,,	24	180
25	F.	64	2 ,,	60	180
26	F.	60	2–3 ,,	144	240
27	M.	74	7 ,,	24	180‡
28	F.	75	3–4 ,,	96	240
29	F.	79	?	72	240
30†	M.	53	2–3 years.	120	240
31	F.	69	2 ,,	W. 16	240

W. = whispered voice. ‡ 15 treatments only.

Nos. 9, 12, and 19, marked with an asterisk, were early cases. Three patients, all men (marked with a dagger), were prematurely aged. Of these, Nos. 10 and 14 died at 52 and 58 respectively from apoplexy. Both were hard livers, hard eaters and drinkers. No. 30 was prematurely aged by hard work. All three had passed many years in the tropics. No. 23 was a careful man, abstemious without bigotry. He retained his improved hearing almost to his death, at 81 years.

The degeneration of the nerve arrangements of the organ of hearing is due largely to the fact that its blood-supply is one of the circulatory back-waters, or "dead-ends," in the body. The cochlear artery is small, and with a lessened force to pump the blood through it the organ it supplies must suffer in nutrition. The effect of the electrophonoïde method on the ear is the ideal means for dealing with such a condition. The massage by sound, which is its essential basis, and which is the normal stimulus for the ear, causes an active hyperæmia throughout the whole organ, resulting in an increased nutrition which greatly improves the cochlear tissues. Even when, after the lapse of some time, the improvement wears off, a further short course of the treatment will restore it. Of course, if the patient can be, at the same time, induced to reconsider his diet and other indulgencies, and keep his bowels in order, the effect is very much better.

THE PAIN OF HERPES ZOSTER TREATED WITH PITUITRIN

By Francis H. Gillett, M.B. Camb.

Dramatic results with the injection of pituitrin for the treatment of herpes zoster have been reported in the American and continental medical press during the last few years, and considering the remarkable relief which sometimes is given to the patient by these injections, it is surprising that the treatment receives so little attention. The report of the following selected cases may help to stimulate further inquiry.

Case 1.—A male aged 40. Came to me on July 19th, 1932, suffering from herpes zoster, the rash covering the two segments below the left nipple. The pain had been present for ten days, and he described it as agonising. Analgesics including morphia had scarcely given him any relief. I gave him 1 c.cm. of pituitrin, and even before the injection was completed he told me that the pain had quite disappeared. A few minutes later he turned very white and had a sudden forceful opening of his bowels. The pain was completely relieved, and 17 hours elapsed before it recommenced and then it became steadily worse. Nineteen hours after the first injection I gave a second 1 c.cm. of pituitrin, and the pain disappeared about one minute later. On July 21st he returned to me with a dull ache present, and a third injection made him quite comfortable for two days. On July 23rd the ache having returned I gave him a further 1 c.cm. of pituitrin. This was followed by the most acute pain, which lasted for about five minutes, and then ceased as abruptly as it had commenced. I saw him again on July 28th, and except for the irritation of the drying scabs he was absolutely comfortable.

Case 2.—A woman aged 61. Pain in the right flank had commenced on Sept. 6th, 1932, and had gradually become worse. I saw her for the first time on the 11th, when the spots had just appeared extending in a band 1½ inches deep, from the spine to the pubes. The pain she described as excruciating, and she had been taking two aspirin tablets every two hours without relief. I gave her 10 units of pituitrin at 10.15 A.M. on Sept. 11th into her deltoid and about one minute later she was freed from all pain in a most dramatic fashion. After a few minutes the bowels were opened, and then the patient went to sleep "for the first time for three days." Seventeen hours after this injection the pain returned, gradually becoming worse, and 4½ hours later I gave her a second injection, which relieved the pain even before the needle was withdrawn. During the next few days she felt what she described as "numbed pain"; she suffered from flatulence and difficulty in opening her bowels. Further injections were given on Sept. 15th and 16th in order to relieve this discomfort, but only a transient relief for a few hours was obtained, and aspirin was found to be sufficient.

Case 3.—A man, aged 63, received complete relief from the pain associated with herpes zoster after I gave him 1 c.cm. pituitrin on July 26th, 1932. The injection made him feel queer and faint. The pain came on again very severely 10 days later but was relieved promptly by

0·5 c.cm. pituitrin without any ill effects. Six weeks later he reported that he had had no return of the pain.

Sidlick[1] in 1930 described 4 cases from a series of 54 patients suffering from herpes zoster treated with pituitrin. These four suffered agonising pain and the treatment was most efficient. Niles[2] in 1932 also described a series of 16 cases treated with pituitrin, and considers that the most brilliant results were obtained in the very early cases and that the course of the disease was shortened by about 2½ days. He found that the severe pain was usually rapidly relieved.

I have found that the injection of pituitrin is an uncertain and by no means an infallible treatment. It appears to act most dramatically when the pain is most intense. I can at present offer no explanation of why this should be so, but the treatment is a valuable asset to the practitioner in his attempt to relieve a patient from the pain accompanying herpes zoster.

Eastbourne.

EVIPAN SODIUM AS AN ANÆSTHETIC IN PULMONARY TUBERCULOSIS

By M. Lask, M.B. Leeds
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ASSISTANT MEDICAL OFFICER AT THE SANATORIUM

In view of the considerable interest which has been aroused in the use of evipan sodium as a general anæsthetic, it may be of some interest to record our experience in the use of this anæsthetic in pulmonary tuberculosis. During the past four months we have administered evipan sodium in 85 cases of pulmonary tuberculosis, all of whom had open lesions and were drawn from all three classes of Group B (London County Council classification). The cases can be grouped as follows :—

(1) Dental extractions	35 cases
(2) Minor operations	20 cases
(3) Operations involving direct surgical treatment of pulmonary tuberculosis—*viz.*, apicolysis, partial thoracoplasty, section of pleural adhesions, and bronchoscopy for drainage of cavities (8 cases)	30 cases

Of these, 25 cases in Groups 1 and 2, representing 29 *per cent. of the total series (or 45 per cent.* of the two groups alone) were undergoing artificial pneumothorax treatment and had already attained satisfactory collapses, while the remainder in these two groups were ambulant, non-febrile cases. In Group 3, 11 cases, representing 13 per cent. of the total series (or 37 per cent. of this group alone) had more than three lobes affected with cavitation at one or both apices.

No premedication was given for the patients in Groups 1 and 2, but those in Group 3 were all given the Hoffmann-La Roche preparation containing omnopon gr. ⅔ and scopolamine gr. 1/150, one hour before operation. In this group the full dose of evipan sodium (1 g. dissolved in 10·5 c.cm. sterile water) was injected, but for Groups 1 and 2—i.e., for dental extractions and minor operations—quantities varying from 4·5 to 10 c.cm. were injected.

As cases of pulmonary tuberculosis in any stage are notoriously bad risks from the point of view of inhalation anæsthesia, a safe and satisfactory alternative is desirable. As a result of these observations, our conclusion is that evipan sodium is the anæsthetic of choice for all minor surgical conditions in pulmonary tuberculosis whenever local anæsthetisation is impracticable. In our series there was only one case which occasioned any anxiety, that of a man aged 55, who stopped breathing for four minutes in the course of a dental extraction. Artificial respiration, the injection of coramine, and the application of hot fomentations to the back of the neck were entirely successful in restoring function. This conclusion is maintained despite the fact that there was always a fall of some 20 per cent. in the blood pressure and that evipan is a respiratory depressant,[1] two factors that would seem to mitigate against its use in pulmonary tuberculosis.

Our observations on the cases comprising Group 3 of this series point to the fact that evipan sodium has a wide field of usefulness in thoracic surgery. It can be used alone where excessive nervousness on the part of the patient precludes the use of a local anæsthetic, or in combination with local anæsthesia for operations such as rib resection, cauterisation of pleural adhesions, and partial or localised thoracoplasty. No ill-effects were observed after the use of evipan sodium ; in fact, there was a remarkable unanimity of opinion among the patients operated upon as to the well-marked feeling of freshness experienced on coming round from the anæsthetic. For the larger operations of apicolysis and thoracoplasty we have, at Preston Hall, been using a combination of regional anæsthesia combined with very mild general narcosis with the Tiegal-Henle positive pressure ether apparatus, and it would seem that this is the most satisfactory form of anæsthesia whenever a thoracoplasty is to be performed in one or two stages, as by this method the dangers and post-*operative risks peculiar to thoracoplasty* are to a large extent obviated.

It may be noted that eight cases of bronchoscopy are included under Group 3. Although anæsthesia was quite satisfactory in each of these cases, we cannot advise the routine use of evipan for this operation, as we consider that in the hands of properly trained operators, bronchoscopy is a safe procedure and should not require general anæsthesia.

Many workers[2] with evipan anæsthesia have stated that for minor surgical operations such as dental extractions, a small dose of evipan (2·5—5 c.cm.) is sufficient. *This is not in accordance with our experi*ence ; we find that out of a total of 55 minor operations (dental extractions, removal of ingrowing toe-nails, opening of whitlows, abscesses, &c.) in phthisical patients, 51, representing 93 of the total, required a minimum of 4·5 c.cm. for satisfactory anæsthesia. We do not wish to commit ourselves to an explanation of this phenomenon and suggest that further work is necessary to elucidate this matter. It is possible that the explanation lies in the fact that these patients have been subjected to toxic influences over such long periods of time, that they may have acquired a certain degree of tolerance to any respiratory depressant. We should like to hear the views of other workers on this point.

The technique of injection used was that advocated by Bayer Products Ltd., but after experimenting with different rates of injection we have come to the conclusion that this is not a point of paramount importance.

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[1] Sidlick, D. M. : Arch. Dermat. and Syph., 1930, xxii., 91.
[2] Niles, H. D. : New York State Jour. Med., 1932, xxxii., 773.

SUMMARY

(1) An analysis of 85 cases of pulmonary tuberculosis in which evipan sodium was used as an intravenous anæsthetic is presented. (2) The use of evipan anæsthesia in pulmonary tuberculosis has proved to be entirely safe. (3) It does not, however, effectively take the place of mild inhalation anæsthesia for major thoracic operations. (4) Generally speaking, though not always, the dosage of evipan required for minor operations in phthisical patients seems to be higher than that required to produce an equivalent degree of anæsthesia in non-phthisical subjects.

We are indebted to Dr. J. B. McDougall, the medical director, for his kind permission to carry out this investigation.

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2. Jarman and Abel: Ibid., 1933, ii., 18.

REVIEWS AND NOTICES OF BOOKS

Swimming Bath Water Purification

Second edition. By F. WILKINSON, M.Inst.C.E., M.I.Mech.E., and F. J. FORTY, B.Sc., A.M.Inst.C.E. London: The Contractors' Record Ltd. 1934. Pp. 262. 12*s*. 6*d*.

THE authors of this timely book are respectively borough engineer of Willesden and deputy borough engineer of Ealing. Swimming has for some years been an increasingly popular exercise, and if a succession of hot summers may be expected the demands for good baths will still increase. The best design and arrangement of a swimming bath has, in the past, hardly been part of the normal stock of knowledge of either borough engineers or medical officers, and many good baths would have been better had such a book as this been available. As Prof. H. R. Kenwood remarks in his foreword, the public health side of the subject is given in this book the prominent place which its importance warrants.

Reference is made to the pioneer work of Dr. F. W. Alexander who chlorinated the water of the swimming baths in the borough of Poplar 25 years ago, and to the early investigation of the bacterial flora of a small swimming bath by Dr. J. Graham Forbes, who found among 4000 organisms per c.cm. of the bath water *Staph. pyog. albus*, *S. epiderm. albus*, and members of the proteus group (from skin contamination), *Strept. salivar.* and others (from saliva), and *B. coli*, *B. pyocyan.*, *Strept. fæcal.*, and proteus (from fæcal contamination)—a formidable but easily explained group of organisms, highly suggestive of the occasional presence of others still less desirable. The authors cite this and other evidence which makes it "abundantly clear that swimming bath water which has been subjected to use by many bathers, without any attempt to ameliorate its condition is objectionable not only from the most obvious—namely, the æsthetic standpoint—but also from the points of view of sheer danger to life through risk of drowning (opacity of the water) and the risk of transmission of diseases, mild, serious, or fatal."

Can these grave risks be avoided in a simple, safe, and economical manner? The authors' reply is "Definitely yes," and they go on to describe the processes of incomplete purification as used by Alexander at Poplar and the later processes of continuous purification—straining, aeration, coagulation, filtration, and chlorination—giving sufficient detail to make the book useful to bath superintendents. Processes of sterilisation other than chlorination—ultraviolet rays, catadyn silver, ozone—are lightly touched on. They have not received the full trial which chlorination has and may be considered as in the experimental stage, although worthy of consideration by those who are starting new baths, and who are willing to give more skilled attention to the sterilisation of the water than is required by a chlorination plant. These agents have the advantage of not leaving an irritant substance in the water.

The arrangement of the bath and the control of bathers are dealt with in a way which shows that the authors have practical knowledge of their subject. The book can be recommended without hesitation to all those who may have to give advice to public bodies or private owners on the management of swimming baths, as well as to those who have to inspect such baths and report on the suitability of lay-out and the efficiency of working.

The Ancestry of the Long-Lived

By RAYMOND PEARL and RUTH DEWITT PEARL. Baltimore: Johns Hopkins Press; London: Humphrey Milford. Oxford University Press. 1934. Pp. 168. 13*s*. 6*d*.

THIS publication sets out in book form an interesting study of the inheritance factor in duration of life, an account of which was originally issued by Prof. Pearl and his daughter in *Human Biology* (February, 1934), and was discussed in a leading article in our own columns (1934, i., 745). One or two sections have now been expanded, more especially those dealing with the group of persons who were chosen to serve as the standard of comparison with the longeval. The rules of selection that governed the composition of this group certainly need very careful consideration, for it is upon the adequacy of this standard that depends the validity of the evidence favouring the extra longevity experienced by the ancestry of the long-lived group. The development of their case for inheritance does not, as the authors admit, make easy reading, but it is presented in as clear and interesting fashion as possible.

The Doctor and His Patients

By ALBERT KRECKE. London: Kegan Paul, Trench, Trübner and Co. 1934. Pp. 301. 10*s*. 6*d*.

THIS book is a series of essays by the late Dr. Albert Krecke, which in the original German ran through several editions. The subjects are well chosen for the purpose of bringing before the practitioner the pros and cons of many fundamental questions which must arise in the course of his professional life. The real value of plain speaking to certain patients, and the practical necessity of deciding what the patient and the patient's relations should be told, are discussed, and wise advice is given on how to deal with the fear of cancer among the public. Other chapters touch on the conduct of practice, giving counsel as to the proper attitude of the doctor towards his colleagues, and towards patients, while the way to maintain just relations between the consultant and the family doctor, and the principles involved in the payment of doctor by doctor are set out. In another chapter warning is given as to the responsibilities which the young doctor has to undertake, and in yet another we have suggestive reflections upon the situations which follow unsuccessful operations. Albert Krecke conducted an excellent private clinic for nearly 20 years in Munich; his annual reports were read by the majority of German surgeons, and he was a prominent contributor for a long period to the *Münchener medizinische Wochenschrift.* His obiter dicta were very sagacious, and here many of them will be found.

Injection Treatment in General Practice

By M. L. GUJRAL, M.B. Punjab, M.R.C.P. Lond. Publishers: Practical Medicine, Nai Sarak, Delhi, India. 1934. Pp. 209. Rupees 6.

THIS book attempts within a very small space to cover the technique of all branches of injection treatment. It ranges from the application of the method to surgical conditions such as hernia, hæmorrhoids, and varicose veins on the one hand, to vaccine and non-specific protein therapy on the other. To achieve such an object in so slender a volume would require, in addition to knowledge of the facts, a measure of considered judgment in interpreting and assessing them. The author has not shown evidence of such critical judgment. The book, apart from being sketchy, contains much information which is not accurate, much advice that could not safely be followed, and what must be almost a record number of typographical errors for a twentieth century medical work. It cannot in any sense be regarded as a trustworthy or sure guide for the practitioner.

British Journal of Surgery

THE July issue (vol. xxii., No. 85) contains the following papers: The Examination of Fresh Tissues by the Wet-film Method, by Leonard S. Dudgeon and N. R. Barrett (London). Through experience gained in examining 1000 cases a high degree of accuracy in diagnosis has been attained. As the process takes a few minutes only its value in operating-room technique is obvious.—Reconstruction of the Forearm after Loss of the Radius, by R. Watson Jones (Liverpool). Following a previous diaphysectomy involving almost the whole length of the radius, the distal end of the ulna was implanted into the small distal fragment of radius, thus constructing a single forearm bone. The function and cosmetic result are excellent.—Localised Hypertrophic Enteritis as a Cause of Intestinal Obstruction, by W. A. Jackman (Bristol). Two cases are described. The onset in each instance was sudden, and produced an "acute abdomen." Recovery followed resection and ileo-cæcostomy.—Gastro-jejunal Ulceration, by A. James Walton (London). Based on 79 cases operated on by the author. The conclusions are that gastro-jejunal ulceration is almost always a sequel of gastro-enterostomy performed for duodenal or pyloric ulceration, and should be treated by partial gastrectomy. Its incidence is not high enough to preclude the use of gastro-enterostomy as the operation of choice for duodenal ulceration.—Protrusio Acetabuli (Central Luxation), by F. Campbell Golding (London). The condition is defined as a "disease process and not an entity." Ten cases are described. In the ætiology disturbance of growth of the Y-shaped cartilage and rheumatic processes are considered of most importance.—Bone-Graft for Non-union of the Carpal Scaphoid, by Gordon Murray (Toronto). The method is used for old fractures showing no evidence of union, and has given good results with complete restoration of function.—X Ray Investigation of the Upper Right Quadrant, by the late W. H. Dickson (Toronto). A comprehensive account of the investigation of gall-bladder disease and of its differential diagnosis by the use of dyes and of opaque meal and enema.—Changes in the Blood-Sugar Level associated with Surgical Operations, by A. G. Weddell and H. E. D. Gale (London). Pre-operative anxiety did not seem to be a factor in raising the blood-sugar level, nor did the length of the anæsthesia. The nature of the operation did influence it. Post-operative glucose salines had no specific effect; the glucose was absorbed and was probably useful as a food.—Diverticula of the Vermiform Appendix, by Harold C. Edwards (London). Ten cases are described, seven of which had been associated with symptoms of appendicitis. The literature is reviewed.—Acute Enteric Intussusception in an Adult, caused by a Lipoma, by R. I. Poston (Oldham). Excision of a gangrenous part of small intestine was successfully performed. The mechanics of intussusception are discussed.—Cysts of the External Cartilage of the Knee with Erosion of the Head of the Tibia, by H. A. T. Fairbank and Eric I. Lloyd (London). Both cases followed injury, and were cured by excision of the cartilage with i[illegible] Kyphosis, by J. M. Edelstein [illegible] cases are reported of a progressive type of deformity resulting from disturbances of normal vertebral ossification.—Enterogenous Cysts, by W. E. A. Hughes-Jones (Melbourne). Ætiology, site and structure, and various forms of treatment are discussed.—The Origin and Evolution of Colostomy, by Tilson Dinnick (London). A historical survey.—The Relation of the Extrinsic Nerves to the Functional Activity of the Œsophagus, by G. C. Knight (Buckston Browne Surgical Research Farm). Observations on the vagal and sympathetic nerve supplies to the œsophagus of the cat.—The Growth of Periosteum in Long Bones, by W. Turner Warwick and Philip Wiles (London). A record of experiments carried out on rabbits at the Courtauld Institute of Biochemistry. The *interstitial* growth of periosteum was proved, and the relation of this particular type of growth to the limiting and modelling of bone is suggested.—Shorter notes on cases are also included.

REPORTS AND ANALYSES

NORWEGIAN CHEESE

NORWEGIAN DAIRIES EXPORT CORPORATION, OSLO, NORWAY.
SOLE AGENTS: MESSRS. W. C. LAMING AND CO., LTD.,
29, TOOLEY STREET, LONDON BRIDGE, S.E.1

THIS cheese is stated to be made from goat and cow's milk; it is described on the package itself as a whey cheese made in Norway. The makers claim that all indigestible milk solids are extracted from the cheese in process of manufacture; it should therefore follow, they state, that "the tissue-building material is available without the indigestible casein content, and that it should be of considerable benefit to most invalids." The Norwegian Official Research Bureau for Dairy Products furnish the following analysis:—

Water	13·41%
Dry matter	86·59%
Containing—	
Ash	4·75%
Fat	29·61%
Protein (mainly milk albumin) ..	10·30%
Sugar (milk sugar)	41·85%

Our analysis of the cheese agrees closely with that given by the Research Bureau, the figures found being the following:—

Water	12·94%
Dry matter	87·06%
Containing—	
Ash	4·33%
Fat	32·00%
Protein	9·00%
Sugar (lactose hydrate)	41·10%

The cheese is of the soft, crustless variety, and of a somewhat dark yellow colour. The percentage of water is unusually low, and the product should thus prove economical in use as well as nutritious. The high content of milk sugar—an unusual ingredient in cheese—will be noted.

THE LANCET

LONDON: SATURDAY, AUGUST 11, 1934

A QUESTION OF NEEDS

THE object of unemployment insurance is to tide people over short periods when work is unobtainable or unobtained. Substantial contributions are made by the worker himself (as well as by the employer and the State) and having paid his share of the premiums he is legally entitled to definite benefits, for himself and his dependants, over a definite number of months. These benefits are not assessed according to his needs; they vary according to the funds available for division. In its new Unemployment Act the Government has put these funds on a self-contained or business basis: hence, if unemployment decreases the benefits should soon become more generous; if, on the other hand, the situation gets worse they will be reduced. The present rates of benefit, which include 2*s.* a week for a child, are not defended as adequate for long periods when there are no other resources; they are meant to prevent temporary destitution till other work is found by the breadwinner. The larger problem of unemployment concerns those who have exhausted their right to insurance benefit and those who have never been covered by any contributory scheme. Under part II. of the Act workers who have fallen out of insurance, and those (e.g., the lower-paid black-coated and the agricultural) who are outside insurance altogether, will come under the care of a new body, the Unemployment Assistance Board. The chairman of this Board is Sir HENRY BETTERTON, under whose able guidance, as Minister of Labour, the Bill went through the House of Commons, and its task is to provide for the vast body of unemployed *according to their needs.* It will be seen at once that the distinction between the two parts of the Act is fundamental. Part I. governs the distribution to insured workers of the benefits to which they are statutorily entitled. Part II. established a new body, now under Sir HENRY's control, which must see that no one, because of unemployment, lacks the necessities of life. The scale of the Board's relief need bear no relation to the scale of ordinary unemployment insurance as we have known it; it is to be dictated solely by what is necessary to "promote the welfare" of the unemployed.

In our correspondence columns last week a distinguished group of physiologists and physicians [1]—whose authority has since been enhanced by the adherence of Dr. A. K. CHALMERS, Prof. J. J. R. MACLEOD, F.R.S., and Prof. LEONARD PARSONS—urged that the Board should now proceed to lay down a scale of needs in accordance with physiological and other requirements. Their experience, they said, leads them to believe that there will be "grave danger of widespread physical deterioration, especially among the growing generation, if a considerable section of the population, obliged for reasons beyond its control to depend for maintenance on public funds, is unable to purchase sufficient food and other necessaries for healthy existence." "We suggest," they added, "that a standard of needs which will fulfil the intention of the Act can only properly be arrived at in consultation with medical and other expert opinion qualified to estimate the minimum requirements of healthy living and the cost of satisfying them for families of various sizes." A similar suggestion is made in more detail in a memorandum submitted to the Board by Miss ELEANOR RATHBONE on behalf of the Children's Minimum Campaign Committee.[2] By Ministerial statements the Board is committed to adopt scales which provide for healthy subsistence, and the Committee points out that the basis of these scales "should be publicly known and capable of being publicly defended by reference to scientific data established in conference with experts." So far as food is concerned it proposes that the Board should use the statement of basic requirements [3] finally agreed upon last spring by representatives of the Ministry of Health and British Medical Association committees on nutrition—translated into terms of cost according to the calculations in the B.M.A. report. The standardisation of needs other than food must rest rather on practical experience than on scientific theory, but the estimates used in the Social Survey of Merseyside (reviewed in our columns last week) and of London would serve as a starting point. For rent the best rule, it is thought, would be to allow for the rent actually paid, unless this was evidently extravagant and cheaper accommodation was available elsewhere in the neighbourhood.

According to none of the current estimates can the needs of large families be met out of ordinary insurance benefit, and when the Unemployment Bill was debated in the House of Commons many members of all parties supported an amendment which would have bound the Unemployment Assistance Board to pay at least 3*s.* for every child. This and other amendments were opposed by the Ministry on the ground that the Board was already under contract to meet all the needs (other than medical) of the unemployed, and that this contract implied something more than merely providing for their physical requirements. Such an obligation, interpreted according to the B.M.A. report, would mean a big advance on the standards hitherto adopted by insurance or poor-law authorities, and the question is whether the Board will really be prepared to go so far. It will be tempted in the first place to accept the argument that scales constructed by sociologists and physiologists are negligible because in fact large numbers of people manage to exist on less. But as the Committee says, "if the Board's scale is not to be based on any scientifically worked out standard of needs, what will it be based on? It will in any case be challenged by reference to such a standard." Again, it may be felt that the Board's rates of relief must not exceed the ordinary unemployment insurance benefit; but this thesis can scarcely be upheld, since the Board is primarily concerned with the victims of prolonged unemployment; moreover, it is specifically empowered to supplement benefit paid under part I. of the Act in cases where this is insufficient even for brief periods out of work. The real difficulty facing the Board is that the sum required to meet the needs, as nowadays understood, of a family of human beings will sometimes be greater than the earnings of the head of the household when employed. It is a cardinal principle that relief must never equal (let alone exceed) wages; on the other hand, it is obvious that relief should vary with the size of the family, whereas wages do not. In these circumstances it is suggested that school meals or milk or other assistance in kind provided for the children by public assistance or charity should not be reckoned in the family resources.

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[1] Sir Farquhar Buzzard, Prof. S. J. Cowell, Prof. J. B. S. Haldane, F.R.S., Mr. Leslie Harris, D.Sc., Sir Gowland Hopkins, P.R.S., Prof. J. C. G. Ledingham, F.R.S., Dr. G. C. M. M'Gonigle, Prof. Charles McNeil, Prof. V. H. Mottram, Dr. J. Boyd Orr, F.R.S., Dr. Charles Porter, and Sir Humphry Rolleston.

[2] Memorandum on the Scale of Needs. Submitted on behalf of the Committee by Miss Eleanor Rathbone, M.P. July, 1934. Obtainable from the Committee, Room 116, Thames House, Millbank, London, S.W.1. Pp. 16. 4*d.*

[3] THE LANCET, 1934, i., 1098.

On the general question whether the nation can afford more adequate methods of relief there will no doubt be more than one opinion. Plain assurances, however, have been given about the scope of the Bill which has now become law, and Miss **Rathbone** and her colleagues are right in saying that these assurances, if implemented, "foreshadow a bold, far-sighted and generous policy, which will revolutionise the standard of assistance to the unemployed in this country."

THE SEX HORMONES

Prof. **Butenandt**, who has played a distinguished part in advancing chemical knowledge of the sex hormones, reviews the present position in a lecture lately given in Vienna.[1] In the course of it he expresses his own point of view very clearly and definitely in the following terms:—

> "The chemical investigation of hormones begins with attempts to prepare the hormone under investigation in the form of a chemically pure, simple substance. The solution of this problem is bound up with the existence of a suitable starting material and of a quantitative test for the hormone. and its goal is reached when the hormone is obtained in well-formed crystals the simple nature of which can be settled beyond doubt with the help of modern physical and chemical methods. When the preparation of a pure hormone is accomplished, then the necessary preliminary conditions are satisfied for determining by a thorough physiological and pharmacological analysis of a simple substance its function in the organism. The problem of the number of hormones taking part in the course of a physiological process can only be solved in this way. From these investigations are then obtained the exact indications for the therapeutic application of the hormone on the basis of an exact measured dosage."

From physiological investigations it has been established that sexual processes are primarily controlled by the hormones of the anterior hypophysis, which is in the position of governor, and by the gonadal hormones, elaborated by the testis and ovary. The hormonal nature of the control by the anterior hypophysis is established, but we are still in the stage of dealing with "factors" characterised by their physiological action and far from the ideal of "well-formed crystals." **Bernhard Zondek** has postulated the existence of two such gonadotropic factors, prolan A and prolan B, promoting, respectively, ripening of ovarian follicles and their luteinisation, but the existence of two separate substances is not yet settled beyond doubt. A third "accessory" or "synergic" factor has also been postulated, which activates the other two, and the disappearance of which entails the decay of sexual function associated with senility. The relation of the physiologically active materials excreted in urine of pregnancy to the materials extracted directly from the anterior hypophysis is still a matter of some discussion, but the evidence is, on the whole, in favour of the urinary factors being different and derived from the placenta during pregnancy. The chemistry of these substances, allied as they are to the proteins, is extremely difficult, and it may be long before the criteria suggested by **Butenandt** can be approached. It is at least necessary to proceed with caution and a due realisation of our ignorance in using these materials in physiological experiments. In the past not a few physiological investigations have been made with materials which were later recognised to be mixtures in varying proportions of substances with different characteristic properties.

It is clear, however, that the function of the hormones of the anterior hypophysis, whatever their number, is that of stimulating the gonads to activity and excretion of their specific hormones. In the case of these latter hormones the position is more satisfactory. The isolation of œstrin (œstrone) and of the testicular hormone, now named androsterone, will be familiar. Chemical investigation has shown that there is a family of natural products containing the *cyclo*penteno-phenanthrene ring-system. As Prof. **Dodds** lucidly explained in his Goulstonian lectures[2] a few months ago, the sterols, the bile-acids, pregnandiol, androsterone, dehydroandrosterone, œstrone, and equilenin form a series in which one member may, on paper, be converted into the next by processes of successively shortening the sterol side-chain, replacing it by a ketonic group, and dehydrogenating; and the suggestion is obvious that such a metabolic chain exists in the body itself. Of equal interest from the chemotherapeutic point of view are the modifications which have been produced in the laboratory. It is possible to prepare from œstrone by vigorous hydrogenation substance with male hormone activity: on the other hand, reduction of the ketonic group of both œstrone and androsterone yields substances in which the original sexually specific activity is greatly enhanced. To the œstrone group may now be added the corpus luteum hormone, responsible for the progestational secretory phase of the uterus; for Prof. BUTENANDT announces that, in collaboration with Prof. W. SCHOELLER and others, he has achieved the isolation of a crystalline active substance of the formula $C_{21}H_{30}O_2$ or $C_{20}H_{28}O_2$, which is a diketone evidently belonging to the same chemical series. Almost simultaneously two other groups of workers[3] have announced the isolation of active substances. There is some inconsistency in these reports, but it cannot be long before another sexual hormone of definite properties is available in a state of purity.

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[1] Butenandt, A.: Wien. Klin. Woch., July 20th and 27th, 1934, pp. 897 and 901; cf. Forschungen u. Fortschritte, 1934, x., 266, 276.

[2] Dodds, E. C.: THE LANCET, 1934, i., 931, 987, 1048.

Concurrently with these chemical advances, the physiological-chemical picture of the female sexual cycle is becoming clearer. It is now possible to visualise a mechanism in which the anterior hypophysis stimulates the ovary, which in turn stimulates mamma, vagina, and uterus, whilst, probably by a nervous path involving a sexual centre in the mid-brain, the gonads react on the hypophysis and inhibit its activity in the final phase of the cycle.

ON DEBT COLLECTING

ONE of the points in favour of contract practice is that there are no book debts, no accounts to send out, and little variability in income. Yet most insurance practitioners are also engaged in private practice; although they do exist, there are few doctors who refuse to see a patient because he is not an insured person. The question of sending out accounts and the getting in of book debts does therefore come into the purview of most practitioners whether they are on the panel or not. Judging from the number of circulars they receive from debt-collecting agencies this appears to be the time when they should be getting busy about it. One circular is headed "without offence"; there seems to be some idea that a patient who owes a doctor for attendance is offended if he is asked to pay up. This may be so in a few cases, but experience shows that even when debtors have been put through the county court they are apt to come back to the same doctor. This question of offence is much overdone. In earlier times practitioners sent their accounts out once a year: the patient might then have forgotten he had ever been attended or have moved elsewhere, and book debts were heavy. Some practitioners now send out accounts half-yearly, most of them quarterly; others do so as soon as the attendance is finished or at the end of the month. Whilst it is definitely bad for any practice to have the doctor in charge of it always worrying about his bills and talking to his patients about them, yet on the other hand he will find his unremunerative work increase rapidly if he never, through fear of giving offence, puts any pressure upon a patient to pay up who can afford to do so. This will have its effect, too, on the selling value of the practice which is based upon gross receipts. If a practice is being sold, for example, at one and a half years' purchase the collection of £10 in book debts will make £15 difference to its value in that year.

It is a good plan to send out accounts at regular intervals even to substantial patients, for they then know the amount of their indebtedness; less substantial patients will often pay at once a relatively small bill of £3 or £4, whilst they will feel £7 or £8 more than they can manage—and this type of person does not like to pay in instalments. If an account is not paid when sent out once it should be sent in again as an account rendered at the next regular interval. If it still remains unpaid the question arises what next to do. It may, of course, be sent in again, perhaps with some friendly remark added to the billhead or even underlined in red ink; but if it then still remains unpaid in a busy practice further help in its collection will probably be needed. Investigation may prove that the address is wrong, that the patient has moved away and letters have not been forwarded, that financial loss has occurred making payment impossible. Before instructing a collector some practitioners send out another form, in which it is stated that the account is considerably overdue and asking the patient to suggest terms for settlement in the course of a few days, failing which it will reluctantly be placed in the hands of X.Y.Z. for collection. X.Y.Z. may be one of the usual debt-collecting agencies or a private individual who takes a commission on the amount he collects. Such collectors visit the houses and trace removals; they arrange for payments on account and, if necessary, deal with county court cases if there is no dispute as to charges. But the results of their efforts are rarely good. They are apt to blame the doctors for not handing them their accounts sooner, and it has been suggested that the practitioner should supply the collecting bureau with a duplicate copy of his day-book from which to send timely reminder. If this bureau charges 5 per cent. on all the money collected, instead of the usual 15 per cent. on those ageing debts which are placed in its hands, the scheme is not likely to be adopted in a practice where there is any secretarial efficiency, although it would save the doctor who worries about his accounts. All he would have to do would be to send off one day-book when the other comes back, informing the bureau of the receipts he had taken in the period.

A woman was once heard to boast in a chemist's shop that she had consulted eight doctors in one small town and had not paid one of them. She would deserve all she got from the firm handling of a competent collector. But just as it is unfair to A, who does his best to pay up, to let B, who does not try to pay, go scot-free, so it is bad policy to put pressure on C, who has had a long spell of illness or has suffered some unforeseen misfortune. Such persons should be transferred to the local public medical service whose rates they can afford to pay.

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[3] Hartmann and Wettstein: Helv. Chim. Acta, 1934, xvii., 878; Slotta, Ruschig, and Fels: Ber. d. Deut. Chem. Gesell., 1934, lxvii., 1270.

ANNOTATIONS

REMOTE CONSEQUENCES OF GASTRO-INTESTINAL DEFECTS

THE causal relationship between abnormality of the gastric secretion and pernicious anæmia, foreseen by Samuel Fenwick, Faber, Hurst, and many others, is now firmly established by the work of W. B. Castle and his American collaborators. Tropical sprue, which is certainly a primary disease of the gastro-intestinal tract, often leads to the appearance of severe macrocytic anæmia or of tetany, whilst cœliac disease has been shown by Bennett, Hunter, and Vaughan to lead at times to several varieties of severe anæmia, to tetany, and to considerable bony softening. These examples illustrate the serious remote effects of certain gastro-intestinal disorders; consequences which may with complete accuracy be classed as deficiency diseases although they are occasioned not by defective diet but by obscure lesions of the alimentary canal, preventing the proper digestion or absorption of certain essential constituents of the normal diet. The manner in which the deranged alimentary canal can in this way create deficiency diseases is discussed in a recent article by Maurice B. Strauss.[1] After reviewing the various experiments responsible for the modern theory of the causation of pernicious anæmia, Strauss quotes the classical case of macrocytic anæmia described by Addison in a patient with ulcerative colitis, and similar cases associated with prolonged diarrhœa and chronic bacillary dysentery. Macrocytic anæmia which has been described in connexion with chronic gastric fistulæ is strictly comparable to the series which accompany strictures of the small intestine, colon, or cæcum. In his own experience he has seen such a condition arise in a child eight years of age in whom various short circuits between loops of small intestine had occurred following intestinal obstruction of inflammatory origin.

Pellagra when it occurred in endemicform is probably due to lack of vitamin B_2 (G), but cases have occurred in which all the manifestations of this disease appeared, with normal dietary, in patients with severe alcoholic gastro-enteritis. Pellagra has been reported in 15 cases of cancer of the stomach, usually associated with pyloric obstruction; it has also been encountered in cancer of the ileum and even in association with strictures of the rectum. Skin lesions identical with those of pellagra have been reported with diarrhœal diseases such as ulcerative colitis, dysentery, and various forms of rectal disease, and also in certain diseases of the small intestine and even of the œsophagus. Another effect of deficiency occasioned by gastro-intestinal disease is to be found in peripheral polyneuritis. Chronic alcoholism as a cause of neuritis has been known for upwards of 150 years, but it is only recently that Shattuck has formulated the theory that "alcoholic" neuritis is in reality a deficiency disease similar to the neuritis seen in beri-beri. This opinion is confirmed by the work of Minot, Cobb, and Strauss, who have relieved alcoholic neuritis by the oral and hypodermic administration of vitamin B whilst permitting the administration of alcohol to continue. Polyneuritis has been reported fairly frequently in cases of pyloric stenosis secondary to peptic ulcer, and it has also been seen in association with dysentery and ulcerative colitis. In fact a mass of evidence accumulates to show that a deficiency caused by defects of the alimentary canal may be responsible for this neurological picture quite frequently.

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[1] Jour. Amer. Med. Assoc., 1934, ciii., 1.

BRONCHOSPIROMETRY

REFERENCE has been already made in these columns[1] to a method by which the function of the two lungs may be studied separately. One of the authors of the original paper, Dr. S. Björkman, has now produced a small monograph on the subject.[2] The procedure is to pass a "double bronchoscope," consisting of two tubes one inside the other. The inner tube communicates with one main bronchus, where an air-tight junction is maintained by the inflation of a rubber armlet, and the outer communicates with the lumen of the trachea (and thus with the other main bronchus), a second rubber armlet being inflated just below the lower end of the larynx so as to prevent air passing in any way except through the bronchoscope. By means of recording spirometers connected with the two tubes, accurate measurements of the functional activity of each lung can be obtained. A certain number of normal people have been examined and supply readings which serve as a background for the results in nearly 60 patients suffering from pulmonary disease. Björkman says that, normally, the left lung accounts for 40 to 50 per cent. and the right lung 60 to 50 per cent. of the total ventilation, but this relationship is of course much altered, where there is disease of one lung. What is surprising is to learn that often the alteration from normal as regards the distribution of total oxygen intake and total carbon dioxide output on the two sides is not uniform; so that while the respiratory quotient for the two lungs together is normal, a different quotient was obtained for each lung separately. The suggestion is made that possibly carbon-dioxide is actively excreted by the mucous membrane of the bronchi and that this process is sometimes impaired by disease. The functional activity of the lungs in different postures has been studied, and also the effects of coughing, confirmation being obtained for the view that sputum from a diseased lung may enter a sound lung during this complicated act. Björkman admits that his method is applicable only to a small group of subjects, but his observations provide the clinical physiologist with fresh objectives.

A GALLERY OF "TROPICAL DOCTORS"

Dr. Gottlieb Olpp, who directs the Institute of Medical Missions at Tübingen and holds a chair in the University, has brought out a remarkable directory[3] of doctors, living and dead, whose names are associated with service in the tropics. He has spread his net very wide—to include Hippocrates, Imhotep, and Berkefeld, inventor of the filter—and has included some 300 biographies of which only quite a modest proportion, not more than one-third, are of German origin; and the collection is made more remarkable by the fact that he has collected a gallery of excellent portraits with only a few relatively unimportant omissions. Dr. Olpp went out to China as a medical missionary and began at once to collect material to perpetuate the memory of men for whom he conceived a profound admiration. For 20 years past he has gone on collecting with the help of correspondents in many countries—he acknowledges the help of Nuttall in Cambridge, Andrew Balfour and Manson-Bahr in London, Stephens in Liverpool—and accepting living experts at their own valuation although impeded by their inherent modesty. The several biographies are interesting in themselves; they have been put together with skill and there is considerable charm in the author's extreme simplicity of style. To the inexpert, approaching the history of tropical medicine for the first time, he recommends the reading of biographies in the following order—viz., Leeuwenhoek, Jenner, Meigen, Pollender, Griesinger, Bilharz, Obermeier, Koch, Laveran, Baelz, Pasteur, Metchnikoff, Manson, Ross, Reed, Gorgas, Carroll, Ehrlich—a list which does credit as much to his sense of proportion as to his freedom from national prejudice. Having been a medical missionary himself he has allowed himself to go strong in recounting missionary endeavour, and here again the reader will be grateful for his indication of seven biographies which deserve study. Happily in this case there are some survivors. To the biography there is in many cases a bibliography attached, and the author takes credit for giving the present address of these who are still alive. The production of the book is as distinguished as its authorship. The paper cover is attractive in design, the typesetting beyond criticism, and the index a model for other effort. The book is indispensable in any medical library.

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[1] THE LANCET 1933, i., 481.

[2] Acta Med. Scand., Suppl. LVI., Stockholm, 1934. Pp. 199.

[3] Hervorragende Tropenärzte in Wort und Bild. Munich: Verlag der Ärztlichen Rundschau, Otto Gmelin. Pp. 446. R.M.30

PHOTOTHERAPY OF THE EYE

A DEPARTMENT for ultra-violet treatment was established at Moorfields Hospital in 1925, under Sir Stewart Duke-Elder, who summarise his work in reports issued in 1926 and 1928. In the book before us [1] his successor, Mr. F. W. Law, considers all the cases who had a full course of such treatment, general or local, in the clinic last year, and some of those treated in the three years preceding. To help towards assessing the permanence of results a letter was sent out to the patients or their parents as to their present condition. The effect of general phototherapy must be read in the light of the fact that the patients were attending hospital three times a week for a long period, and therefore received also other treatment in an unusually thorough way. This resulted in a high standard of cleanliness, for the undressing of a child three times a week before a nurse has its educative value on the mother. With these provisos Mr. Law endorses the favourable opinions expressed by other writers of the ultra-violet treatment of blepharitis, phlyctenular disease, and conjunctivitis in children. Most forms of keratitis derive some benefit; this applies, in Mr. Law's experience, even to interstitial keratitis. Syphilitic iridocyclitis and tuberculous disease failed to react, and, on the whole, his results do not reach the high level of some other workers. General phototherapy is, in fact, no more than an adjunct in treatment. Local irradiation in its own sphere has more to offer. Mr. Law reports 51 cases, nearly all of them corneal ulcers or different forms of keratitis, treated by focusing the rays exactly on the spot. Although he has himself never seen a cataract remotely connected with ultra-violet therapy, the application calls for continual care. Preferably the pupil should be small, although this is not always feasible. The usual initial dose is one of 2 to 2½ minutes, but if the duration of the beam has to be as oblique as 45° the time of exposure may be increased by one-half; if to 60° it may be doubled. Although corneal ulcers undoubtedly heal more quickly when irradiated there is not sufficient evidence that the density of the subsequent scar is less, nor is there any effect on established nebulæ. In tuberculous iritis there is often a suggestion of improvement, but the dosage needs careful watching. Throughout the monograph Mr. Law maintains a severely critical attitude towards his own results. In using radium and X rays for eye diseases the danger of inducing cataract must, he says, always be taken into account. Infra-red rays play no part as a therapeutic agent in diseases of the eye; they are a source of possible injury to cornea, lens, and retina—e.g., eclipse blindness.

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[1] Ultra-violet Therapy in Eye Disease, with a review of other forms of Radiant Energy. By Frank W. Law, M.A., M.D., B.Chir. Camb., F.R.C.S., Assistant Surgeon, Central London Ophthalmic Hospital; Pathologist and Curator, and Medical Officer in charge of the physico-therapeutic department, Royal London Ophthalmic Hospital (Moorfields). With foreword by Sir Stewart Duke-Elder, M.D., F.R.C.S. Published for the Middlesex Hospital by John Murray. 1934. Pp. 78. *5s.*

THE ENGLISH TONGUE

THE history of the English language is not a matter for philologists; all persons with claims to education, in the countries where English is spoken, should have some acquaintance with the origin and development of their own tongue. In the United States of late this feeling has certainly been active, and a short article on the subject in the *Medical Record* for July 4th is worth attention. The writer says that few persons know the origin of "the King's English," evidently thinking that fuller appreciation of the lineage of language would minimise its frequent abuse. His pithy sketch of the Saxon invasion and the settlements of parts of England at different epochs gives reasons for the gradual evolution of English to its present standard. According to him it was not until 1385 that the language of the English-speaking peoples stepped out of its dialect petticoats to become an adult tongue, since when it has taken its place as the most universal means of intercommunication. On the cover page of the same issue of the *Medical Record* there is a picture of Dr. Thomas L. Stedman, for many years the editor of the journal, and this is opportune, for Stedman is a master of English, as well as a versatile linguist. Largely through this fact he has made a reputation as a lexicographer, where an accurate knowledge alike of the subject in hand and of languages is essential.

EPIDEMIC MYALGIA IN SWEDEN

IN a note presented to the permanent committee of the Office International d'Hygiène publique, Dr. R. Huss [1] outlines the salient features of the epidemic of myalgia which, in the summer and autumn of 1931, claimed many victims in the southern coastal areas of Sweden and in Denmark.[2] Though not a single case was fatal, the manifestations of the disease, when it was of the abdominal type, led occasionally to an exploratory laparotomy which proved nothing but the mistake in making it. There was also a thoracic type with bilateral symptoms referable to the lower chest. The most common complications were orchitis (some 50 cases) and dry pleurisy (about a score). Catarrhal symptoms referable to the respiratory tract were rare. Some cases were characterised by euphoria and flushing of the face. It seems that the epidemic had had its forerunners in 1[illegible]27, 1929, and 1930. The outbreak of 1931 began in the middle of June in the seaport of Marstrand, at which t[illegible] Swedish warships were stationed from Jun[illegible] 8th to 26th. The sickness-rate on these ships a [illegible] days after they had left Marstrand was such th[illegible] about a third of the crews was involved. Bet[illegible] the ages of 14 and 17 there were 190 person[illegible] of whom [illegible] ill. Between the ages of 20 and 30 there [illegible]

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[1] Bull. de l'Off. Internat. d'hyg. pub., June, 19[illegible]

[2] See THE LANCET, 1933, i., 70[illegible]

12 patients out of a possible 44, and none of the 14 members of the crews who were over the age of 30 developed the disease. Apparently, therefore, it has a predilection for adolescents. As for the mode of propagation, Huss is inclined to defer final judgment till more tangible evidence is available. In favour of a contact infection was the behaviour of the epidemic on board the two warships; but the theory of a contact infection was not supported by the tendency of the disease to flare up in certain well-defined areas on the seaboard, and to leave whole communities here and there in the same area untouched. The occurrence of the outbreak in the hottest months of the year was suggestive of an insect-borne disease, and its explosive character on certain occasions gave support to the theory that it was conveyed by water.

EXHIBITS AT THE COLLEGE OF SURGEONS

THE Royal College of Surgeons of England has received an important addition to the historical section of its museum by a gift from Miss K. R. Image of over 300 surgical instruments belonging to her father and grandfather. The collection, which was formerly in the possession of the faculty of medicine at Cambridge, was made by William Edmund Image, an honorary fellow of the College, and his son, Francis Edward Image, M.B. They practised at Bury St. Edmunds between 1830 and 1913, and the instruments may be said to represent the complete armamentarium of a country general practitioner of the last century. They are now on view and include more than 40 varieties of scalpels, bistouries, and dressing instruments, together with knives for amputation and lithotomy. The gynæcological and obstetric instruments comprise several types of vaginal specula, from the old bladed patterns to Fergusson's silvered glass instrument, the midwifery forceps of Robertson, Waller, and Simpson, and cephalotribes and forceps in great variety. Lithotomy instruments are also well represented and include the lithotrites of Fergusson, Thompson, and Weiss, as well as stone-crushers, gorgets, and the lithotomy knives devised by Liston and Thompson. There is a comprehensive collection of ophthalmic, aural, and nasal instruments which illustrate the period of development between 1830–70, and the instruments for amputation include Liston's and Lisfranc's knives, saws, and several types of bone-forceps.

Among the earlier exhibits are a number of dry-cupping sets, scarifactors, and glasses complete with spirit lamp; cauteries, stethometers, otoscopes, and one of the earliest types of Dudgeon's sphygmograph. There is also a pair of the long clinical thermometers, introduced by Prof. William Aitken of Netley, used in hospitals in 1866. Another gift to the College, which is of special interest in this connexion, is a thermometer that originally belonged to Dr. John Aikin, of Warrington, the medical biographer, who was born in 1747 and died in 1823. It is 6¾ in. in length and is bent at a right angle of 25° at one end terminating in the mercury bulb. The index is of ivory which is clipped on to the stem and is graduated in half inches from 1 to 12, and is divided into tenths. It is marked "Cary. London," and is enclosed in a velvet-lined leather case. It was probably used before the end of the eighteenth century, and is similar to one described as having been used by Sir Astley Cooper in 1802, which also had an ivory scale. This authentic specimen is probably the earliest type of clinical thermometer known, and descended in direct line from Dr. Aikin to Mr. C. W. Brodribb, who presented it to the museum.

Instruments of more recent date now on exhibition at the College are represented by the original model of Kocher's artery forceps made for the inventor and presented by his son, Dr. Albert Kocher; also a set of four instruments devised and used by Prof. Trendelenburg for performing embolectomy,[1] which were given to and presented by Sir Charles Ballance. Objects of more general interest include a mummified hand said to have been that of Dick Turpin, the highwayman, who was hanged at York in 1739, and some relics of the Roman occupation discovered last year near the Poultry and presented by Dr. Mervyn Gordon, F.R.S. They consist of two spoon-sounds, two ear-scoops, a pair of forceps with ear scoop, and a long needle, all in an excellent state of preservation. They are believed to date from the first century.

INJECTIONS OF CARBON

SOME observations by Gaudier and Démarez[2] on the treatment of infections by means of injections of animal carbon arise out of an earlier communication to the French Academy of Medicine by Saint-Jacques, of Montreal.[3] They have given this treatment to 25 patients suffering from various infections, surgical, medical, and obstetric. Each dose consists of 2–5 c.cm. of a suspension of animal carbon in isotonic glucose serum, containing from 1 to 3 per cent. of carbon, and the injections were given every or every other day or at longer intervals, the maximum total dosage being 42 c.cm. of a 2 per cent. solution. The injections were painless even when some of the solution was deposited outside a vein, and there was no violent reaction at the time such as pallor, flushing, shivering, dyspnœa, or any change in the pulse and blood pressure. There was not even a febrile reaction, and the treatment could not, therefore, be considered as a variety of shock treatment. Gaudier and Démarez believe that as a rule the injection was followed by a fall in temperature of at least 0·5° C.—a fall which in the favourable cases was maintained and even continued in association with clinical improvement which was sometimes startling. The carbon did not seem to have a direct antipyretic action, and it was ineffective when escape was not provided for collections of pus. The best results were achieved in diffuse, inflammatory processes, when the reaction of the organism to the infection hung fire, or when it ran an acute and serious course without free suppuration. It is said that pneumonia and acute articular rheumatism also responded satisfactorily to the remedy, but its mode of action remains obscure.

CANCER OF THE LARYNX

Dr. J. H. Douglas Webster reports[4] two cases of laryngeal cancer in which the patients have been well for nearly 12 months after treatment with X rays, according to the protracted fractional method described by Dr. Coutard, of Paris, in our issue of July 7th. Dr. Webster's previous study of 42 cases of cancer of the larynx shows clearly that the disease can rarely be controlled by the methods of X radiation which have been successful in other situations. All methods he has employed have ultimately led to failure, except occasionally in post-operative "prophylactic" cases, in which it is not known whether any malignant cells have been left in the tissues. Exact clinical details of the two cases now reported are not given, but it is stated that the first had a large fixed mass over the right side of the larynx and œdematous swelling of the right arytenoid and false cord; a specimen removed from the larynx was only œdematous tissue, but one from the external tumour showed an undifferentiated squamous-celled cancer with much fibrous reaction. The second patient had undergone a partial laryngectomy, with removal of the left cord and all visible growth, after he had refused total excision of the larynx; the tumour was of Grade 3 in Broders's classification. In neither case is there any sign of recurrence almost a year later, and Dr. Webster believes that the method gives great promise for the future usefulness of X ray therapy in squamous-celled carcinoma of the larynx, pharynx, and tonsil. The technique unfortunately is very laborious, so that each patient requires an expenditure of time and energy which would suffice for about 20 treated by ordinary "short-time" radiation. The essentials of Coutard's plan is that each dose is *protracted*, or of low intensity, 3 to 4 r per minute instead of 30 or 40 r as often given, and that the doses are highly *fractionated* compared with other fractional methods; the entire dosage is divided up over 2–4 or more weeks, and the patient should not be treated for more than three or four hours a day if undesirable reactions are to be avoided. As the result of these low-intensity treatments, spread over a long period, an extraordinarily high total dosage can be applied with safety, and the success obtained seems to depend on this fact.

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[1] See THE LANCET, 1912, i., 139.

[2] Bull. de l'Acad. de Méd., 1934, cxli., 45.

[3] See THE LANCET, 1934, i., 418.

[4] Jour. Laryng. and Otol., July, 1934.

SCHOOL-CHILDREN IN CENTRAL EUROPE

A GENERAL idea of the conditions of childhood in a central European city is given by Dr. E. Neuber's survey[1] of school-children from 6 to 8 years old in the elementary schools of Debrecen in Hungary. Neuber himself is actively concerned with the campaign against venereal disease, and among the 1612 children studied he found 36 who were definitely syphilitic, while a further 43 were probably infected. A gynæcological investigation carried out in nearly 70 per cent. of the girls showed, among other things, the presence of a vaginal discharge in 68 out of 538, and 3 of these proved to have gonorrhœa. It is thought that more elaborate examination would have raised this figure to a much higher level. A tuberculin reaction was positive in 30 per cent. of the children, and radiography of the lungs, carried out for 1583, revealed definite changes in 648 (that is, over 40 per cent.), though only about half of these were of such a nature as to suggest tuberculosis. Roughly speaking, therefore, one-fifth of the children showed changes in the chest suggesting tuberculosis, but it was thought that in only one in five of these was the disease in an active state. Intestinal parasites were found in about a quarter of the children, the commonest being *Trichocephalus dispar*; nits and pediculi capitis were present in just over 30 per cent., and the predominance of girls among them leads Neuber to plead for a compulsory Eton crop (Etonfrisur). The results of ophthalmological investigation revealed what seems, in comparison with standards in this country, very few defects, for out of the 1325 children examined 1250 were passed as completely normal. Of those with refractive errors, myopia accounted for 4, hypermetropia for 14, and astigmatism for 20. On the other hand, dental disease appears to be as common in Hungary as in this country, since nearly 70 per cent. of the children out of the total of 1612 had defects in their teeth. Their incidence was considerably less among children coming from the country than among those who were town-bred.

Neuber's survey was made in 1931–32, before the economic depression reached its greatest depth. A report by Dr. R. Paula Lopes to the International Labour Office[2] suggests that in Germany, Poland, and elsewhere there has been a serious deterioration since that time. In an inquiry into the situation of 383 unemployed families in the Silesian mining industry and the Lodz textile industry it was found that no less than 311 of the 382 children of school age could not attend school regularly, the chief reason being lack of clothing. A report of the Prussian Ministry of Social Welfare records that in all the Prussian schools there has been a striking increase since the end of 1931 in the number of cases of anæmia, scrofula, dental caries, diseases of growth, and nervous states which reveal themselves in early fatigue and inattention. "Numerous reports from clinics, health centres, and school medical officers confirm these facts; some of them also mention a notable increase in the incidence of rickets and tuberculosis." The gravity of all these facts, Lopes points out, is increased by the inability of the municipalities to devote large sums to the relief of poverty. Thus the free distribution of milk in Berlin was cut down by 50 per cent. in 1932, and in the same year an inquiry made by the Verband der Kommunal-Schulfürsorgeärzte showed that similar restrictions had been introduced in the 43 towns covered.

DISTRIBUTION OF BOVINE TUBERCULOSIS IN MAN

DURING the past two years the tuberculosis division of the State Serum Institute in Copenhagen has followed a uniform technique in the differentiation of human and bovine strains of tubercle bacilli derived, for the most part, from human sources. Some idea of the extent of these operations is given by the statement, published by Dr. K. A. Jensen,[3] that during these two years 7031 specimens have been examined, and 1772 strains of tubercle bacilli have been isolated from the same number of patients. The interest of Dr. Jensen's work does not, however, lie so much in the volume of his work as in his geographical handling of it. In the past, as he points out, most statistics have been concerned only with the relative number of human and bovine strains found in a given laboratory, and with a grouping of these strains according to the ages of the patients from which they came. By referring each strain back to the area in Denmark whence it came, Dr. Jensen has succeeded in showing how impressively unequal is the distribution of tuberculosis of the bovine type in human beings throughout the country. In some counties it is practically non-existent. In others its incidence is much in excess of that indicated by the large collective statistics of any other country. Such a geographical survey of tuberculosis in human beings infected with the bovine type should prove of great practical value where the eradication of tuberculosis in cattle is under discussion. It will be remembered that Bang's system for the eradication of tuberculosis in cattle has for many years been put into practice in Denmark with the result that it is almost completely stamped out in certain areas. No greater spur to the completion of this work could be found than Dr. Jensen's investigations, which so clearly link up tuberculosis in cattle with tuberculosis of the bovine type in human beings. If, he argues, tuberculosis in cattle is not stamped out, the time may come when, with the diminution of the human type, the bovine type may take its place, increasing among human beings, even though it remained stationary among cattle. A year ago in our own columns,[4] A. S. Griffith and W. T. Munro reported a "startling" number of cases of pulmonary tubercle associated with the bovine bacillus in England and Scotland. They were very unequally distributed over the country.

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[1] Wien. klin. Woch., 1934, xlvii., 364 and 391.

[2] International Labour Review, June, 1934, p. 784.

[3] Nordisk Medicinsk Tidskrift, May 12th, 1934, p. 590.

STATESMAN, PRIEST, AND PHYSICIAN

THE name of Robert Laws, who died in a nursing-home in London at the age of 83 on Monday last, is probably familiar to many as a missionary and statesman, though the fact that the starting-point of his career was medical may have escaped notice. He received a full medical education, however, at the University of Aberdeen, and later studied at the Edinburgh Presbyterian Theological College. He obtained a doctorate in both faculties and was ordained a medical missionary in 1874. He continued in medical practice as a resident in the Glasgow small-pox hospital until the founding by the United Presbyterian Church of a mission in Nyasaland in memory of Livingstone. Laws formed one of the small party sent out to organise the starting of the mission, and his medical knowledge was of great value to his comrades; in the development of the work which followed it proved of the first importance. Two years later his wife joined him in Nyasaland, and for 50 years the Livingstonia Mission had Laws as its organising head. While he placed his work for the gospel in the forefront of his personal programme, his energy in the cause of education, his industry in acquiring native languages, and his organising power were the other qualities to which he owed his wide influence in the Protectorate. He translated the New Testament into Nyanja, and wrote an English-Nyanja dictionary and various school-books in Nyanja and Tonga. He was nearly 80 years of age when he left Nyasaland to pass the days of his retirement in Edinburgh.

ANOTHER KIND OF MILK

THE Milk Marketing Board are proceeding with their scheme for a register of "accredited" milk producers, and its operations are to begin next January. The new scheme establishes what is in effect yet another grade of milk. To become accredited, the producer must have his herds "clinically" examined once in six months by an approved veterinary surgeon, and must permanently remove all animals considered a danger to the milk-supply. The county agricultural organiser will certify that the methods of production and handling are satisfactory, and the county medical officer of health or county bacteriologist will examine three samples annually and declare that their bacterial count does not exceed 200,000 per c.cm., and that *Bacillus coli* is absent in 0·01 c.cm. These bacteriological standards are the same as for Grade A milk on delivery, but cows supplying Grade A must be inspected every three months. Under the new scheme the accredited producer will have an extra penny a gallon for his produce, this being raised by a small levy on all producers of milk. It is hoped that with this inducement a large proportion —even a majority—will seek to qualify and that the whole standard of milk production will thereby be raised. So far so good; and in commending the proposals the *Times* (August 6th) expresses surprise that "the authorities at the Ministry of Health have not been at all enthusiastic over the scheme, because it does not, in their opinion, go far enough." Readers of an article from a well-informed correspondent which we published on May 12th (p. 1028) will be less astonished. "Assuming efficient control," he said, "it is obvious that at the best it is Grade A milk over again but with rather relaxed standards. And Grade A milk is fairly universally accepted as failing to give a safe milk-supply. . . . Stated briefly, the scheme of the Milk Marketing Board will materially assist in the production of a clean milk-supply but will do comparatively little to give a safe milk-supply, and it is a *safe* milk-supply which is insistently demanded by the medical profession." While every step towards cleanliness is highly desirable and the Board is making a useful advance in the right direction the credentials offered by accredited milk are not sufficient to make it a suitable drink for children unless its dangers are removed by heating. A roll of accredited producers combined with pasteurisation of the milk-supply would, as our correspondent pointed out, be a very valuable combination; but where there are no adequate guarantees of safety the profession will never be able to join wholeheartedly in the cry of Drink More Milk.

STANLEY MELVILLE

A COMMUNICATION from Sir Humphry Rolleston, Lord Rutherford, and eight representative co-signatories, asks that the services rendered to radiology in all its aspects by the late Dr. Stanley Melville should be recognised by some such suitable memorial as a travelling fellowship in radiology connected with his name. The National Physical Laboratory, the Royal Society of Medicine, the Society of Radiographers, St. George's Hospital, and the Brompton Hospital—the two institutions with which Melville was connected, and the British Institute of Radiology, all endorse the appeal, as does the British X Ray and Radium Protection Committee. The connexion of this last body with the appeal is particularly significant, for Melville played a prominent part in bringing home vividly to the public and the medical world the dangers of X ray work as illustrated by the tragic deaths of so many of the pioneers. Melville was also active in establishing the Cambridge diploma in medical radiology and electrology; the incorporation of the British Institute of Radiology with the Röntgen Society was another of his successful activities, for he always displayed particular anxiety with regard to the welfare of the lay-workers. Melville was himself a long and sad sufferer from injuries incurred in his professional work; he never spared himself, and always thought of others. We commend the movement to keep alive his memory to our readers. Dr. J. Duncan White and Dr. A. E. Barclay, of the British Institute of Radiology (32, Welbeck-street, London, W.1), will receive now donations however small, and a meeting will be called later of those who subscribe to decide upon the exact form which the memorial shall take eventually.

THE medical superintendent of the new British Post-Graduate Medical School, Sir Thomas Carey Evans, has received from Mr. Arthur Evans a collection of pathological specimens illustrating diseases of the gall-bladder. The specimens are beautifully mounted, each with a clinical record of the case, and the collection will form the nucleus of the museum of the school. It is hoped that other collectors may be as generous.

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[4] THE LANCET, 1933, i., 399.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XIV.—PROGNOSIS OF APPENDICITIS IN CHILDHOOD

THE prognosis of appendicitis in the case of a child is a matter of some difficulty, much more so than in that of an adult. It may be regarded as an axiom that the younger the subject the more dangerous is the outcome.

That this should be so is due to several circumstances. The appendix in a child differs from that of an adult in that the walls are relatively thin and contain relatively a larger amount of lymphoid tissue. As a consequence, should appendicitis occur the reaction is more acute, and the peritoneum is so rapidly involved by infective process s that protective adhesions between adjacent structures have had little or no time to form. The blood supply to the appendix in childhood is not so adequate as that in later life. This is another factor which accounts for the more rapid extension of inflammation in the former. The most common position of the appendix in a child is the retrocæcal. This is due to the fact that with the descent of the cæcum during development the appendix is liable to be carried behind this structure. As a rule the omentum is so poorly developed in a child that it can afford very little protective influence. As compared with an adult, the child has had but little time to acquire immunity, and consequently its intestine is much less resistant to bacterial infection. For some reason or another appendicitis tends to occur in an epidemic form in children while it does not do so in adults.

The actual prognosis of appendicitis in a child, although difficult, depends on certain factors which should be taken into consideration in every case.

Early Diagnosis.—Although this is of vital importance it is often neglected by the practitioner. It must be remembered that appendicitis is the most common and, in my opinion, the most important abdominal disease occurring in children. This is borne out by statistics from children's hospitals both at home and abroad. "Colicky" abdominal pains in children are too often, even in these enlightened days, thought to be natural phenomena both by parents and practitioners. Rupture of the appendix and peritonitis are not infrequently caused by the administration of a dose of castor oil given in order to relieve such pains. It cannot be stressed too forcibly that "colicky" abdominal pains in childhood demand most careful investigation, and the possibility of an inflammatory condition of the appendix should always be kept in mind.

The mortality varies greatly, and is dependent chiefly on the time which has elapsed between the onset of the acute attack and operative treatment. There is only one form of treatment, and that is operation, which should be carried out immediately the condition is diagnosed. If this were more widely realised by both the medical and lay public there would be far fewer tragedies in the world. In the treatment of acute appendicitis there is no reason whatsoever for delaying operative measures.

Age of the Patient.—Although uncommon in infancy appendicitis has been recorded in babies soon after birth. As a general rule the younger the infant the more serious is the prognosis. The mortality during the first three years of life is high; infants cannot tolerate septic infection. The mortality is higher among boys than girls. The younger the child the less likely is the infection to become limited, owing to the thin wall of the appendix, to its poor blood supply, and to the immature and short omentum, which does not nearly reach the right iliac fossa, and cannot exert its protective mechanism which is so often such a useful feature in adult cases. In the young child again, as has been said above, immunity has not yet been acquired against the various forms of bacteria present in the bowel.

The *position of the appendix* cannot always be ascertained prior to the operation but is of great importance in prognosis. It must be generally understood that a prognosis given before operation is subject to review thereafter. If this were done as a routine there would be fewer disappointments and a better understanding between the surgeon, the family doctor, and the parents of the patient.

The appendix may occupy various positions but some are of more moment than others. The retrocæcal appendix is very common, and as long as the infection is limited to the appendix the prognosis is good. If, however, the appendix has perforated and the cellular tissues on the posterior abdominal wall are infected the prognosis is grave. Another type of case in which the prognosis is not good is one in which the appendix is long and is actually retrocolic. Here it is difficult to prevent the absorption of septic material; moreover, the infection is very liable to spread upward towards the diaphragm. In this way pulmonary complications may be added to the list of sequelæ which in themselves are severe in an infant already toxic from absorption from the acute appendicitis. The pelvic appendix is quite common, as may be gathered from an analysis of a large series of cases of appendicitis occurring in children. The prognosis is good, even when the appendix has ruptured. The infection is limited to the pelvic cavity, and the pelvic peritoneum is better able to deal with it than the peritoneum elsewhere. These cases, however, are often diagnosed late, and the surgeon frequently has to operate when there are definite signs of peritonitis. The anterior position, or the so-called "splenic" position of the appendix, is fortunately rare, as the prognosis is anything but good. The appendix lies either in front of or behind the terminal part of the ileum, and as it is there in relation with the root of the mesentery, there is a grave possibility of acute intestinal obstruction. Furthermore, the veins in the root of the mesentery may become thrombosed and lead to gangrene of the gut, or portal pyæmia may ensue with fatal results. In cases of pain in the *left iliac* fossa left sided appendicitis must be considered. As a rule this form is diagnosed late, and the prognosis is therefore unfavourable. In cases of transposition of the viscera the appendix is found with the cæcum in the left iliac fossa, where it is also situated in cases where intestinal rotation has failed during development.

Type of Infection.—It is not always possible to be sure of the type of organism responsible for acute appendicitis, but quite commonly this can be ascertained. A streptococcal infection makes the prognosis unfavourable; children do not tolerate streptococcal infection at all well. In these cases postoperative abscesses are common. Streptococcal appendices may be hæmatogenous and may follow infection of the throat with the same organism, the appendicitis frequently developing before the child acquires immunity from the primary focus. The prognosis is good when infection is limited to the appendix itself. It is at this stage that the appendix should be removed, and an excellent result should be obtained in a hundred per cent. of cases. The appendix is swollen and turgid, but no infection has spread into the peritoneal cavity, although there may be some enlargement of the lymphatic glands in the ileocæcal angle. If the infection has been more severe, or the case is seen at a later stage of the disease, the appendix may be gangrenous and perforated. The perforation may be opposite a stercolith, or may occur quite commonly in the absence of one. The most frequent site of occurrence for a perforation of the appendix is at the junction of the proximal two-thirds, with the distal third ; the meso-appendix carrying the appendicular artery is mostly present only in the proximal two-thirds of the appendix, and perforation occurs at the junction of the good and poor blood-supply of the appendix. A guarded prognosis is necessary when the appendix has perforated in a child. The highest mortality-rate is found in the cases in which general peritonitis is present ; children cannot withstand such a general toxæmia.

Concomitant Diseases.—When the child is already suffering from some congenital or acquired disease or abnormality, such as a cardiac lesion, nephritis, bronchitis, diabetes, cyclic vomiting, or one of the exanthemata the prognosis is gravely affected.

Post-operative Treatment.—This is an important factor in prognosis. Anxious parents may try to insist on an operation performed at home, the patient sleeping in his own cot, and with his own nurse in attendance. The psychology of the child must be taken into account, but it is essential that a trained nurse should be in charge. Nurses trained at a children's hospital are, in my experience, far more competent to look after cases of acute appendicitis in children than those trained in a general hospital. It is also better for the patient to be admitted to a special nursing home for children. A trained nurse who is kind, sympathetic, and cheerful, and understands a child, is of more value in post-operative treatment than all the drugs in the pharmacopœia. A good nurse will frequently encourage sleep in cases where drugs have continually failed.

Complications.—Fortunately, it is only following perforation that complications such as secondary abscess formation, fæcal fistulæ, and acute intestinal obstruction arise. The possibility of the supervention of any one of these must be borne in mind when a prognosis is being offered.

Chronic Appendicitis.—It is wrong to imagine that chronic appendicitis is a disease limited to adult life. Cases occur in children and often show quite typical symptoms. Here, again, the correct treatment is appendicectomy and the prognosis is good.

The prognosis of appendicitis in children is thus not easy to determine by itself. The general condition of the child, its disposition and mentality are factors to be taken into consideration in every case.

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SPECIAL ARTICLES

SCHOOL MEDICAL HISTORY OF PERSONS WHO DEVELOP PULMONARY TUBERCULOSIS IN YOUNG ADULT LIFE*

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ROUTINE medical inspection has for some time been advocated as one of the hopeful methods of advance in modern preventive medicine. It is not our present purpose to discuss the place or merits of such a practice in the field of modern hygiene, but in the following investigation we desire mainly to illustrate the need for, and one of the practical applications of careful record keeping of the findings to be derived from such periodical medical overhauls. The primary objects of regular inspection appear to be: (1) the treatment of minor ailments which otherwise would perhaps be ignored and which occasionally are the precursors of disabling or even fatal sickness ; (2) the diagnosis of more serious disease in its incipiency when the exhibition of skilled treatment is most likely to be successful ; and (3) the recognition and, if possible, the rectification of deviations from some, often arbitrary, "normal" standard. With regard to the expediency of (1) and (2), little need be said—their value is self-evident. It is to the third point that we desire to devote special attention in this paper. It is well known how individuals, aparently perfectly healthy, differ widely from one another in respect both of physical and physiological attributes ; but we know too little about how such variations predispose to different diseases or influence the duration of life and manner of dying. What, for example, is the precise significance of discovering in early adult life deviations above or below a certain normal (usually an age-specific average) in the case of body-weight, blood pressure, exercise tolerance, vital capacity, &c.? We know as a result of certain inquiries that some of these—e.g., overweight—are of significance in predisposing to the onset, or perhaps being one of the early signs of certain diseases or in curtailing life. Similarly, too, it is suspected that such conditions as enlargement of the tonsils and focal sepsis, if untreated, predispose to or cause more serious disease later in life. In general, however, the significance of individual variations is insufficiently known to allow of accurate prognostication. It is from this standpoint of research particularly, therefore, that we would stress the present value of routine medical inspection and accurate and detailed record keeping. The correlation of variations of bodily attributes in individuals at a given period of life with subsequent life-history is, we submit, one of the principal tasks to which modern hygienists must apply themselves before the maximum return from routine examination will ever be forthcoming.

Origin and Nature of the Inquiry

A problem illustrative of the foregoing points confronted us recently with regard to pulmonary tuberculosis developing in young adults. The course of mortality from this cause at these ages (15–25 years) has, compared with that at other periods of life, become a matter of special concern ; and the question arose as to whether by routine clinical examination it would be possible to predict the type of child most likely to become tuberculous in later —i.e., in this particular case, young adult life. In other words, we are asking ourselves, can anything distinctive be discovered in the physical make-up or previous medical history of school-children who are destined to develop tuberculosis at ages 15–25 years which would suffice to indicate or even make us suspect the probable future appearance of the disease? Are they, in fact, different in any way from school-children who at the subsequent ages, 15–25 years, are, so far as is known, free from manifest disease of this kind? De novo inquiry to answer such a question would obviously involve time and money; but the idea occurred to us that material for exactly that type of experiment was already available through the official records kept regarding the state of children as found at school medical inspection. We accordingly approached the public health officials of the city of Dundee for the necessary records, and to them, Drs. W. L. Burgess, A. E. Kidd, and J. H. Hunter, we desire to record our indebtedness for the willing response to our request which has made this study possible.

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* A paper read before the Tuberculosis Society of Scotland, April 20th, 1934.

The inquiry involved searching out the school medical inspection records of persons notified as having developed tuberculosis within the ages mentioned, and simultaneously a series of records for a control group, these being as far as practicable for persons of the same age and sex, from the same schools, examined by the same medical officer at the same time. (In practice, this ideal was not quite obtained, particularly with regard to the exact similarity in the dates of examination.) Comparisons of this nature eliminate to a great extent differences of social class and correlated factors between the two groups of children and, more important still, the examination by similar medical officers eliminates for all practical purposes differences of medical assessment. The latter is vital in comparisons involving the incidence-rates of such non-measurable factors as malnutrition, enlargement of the tonsils, adenoids and glands, rickets, unsatisfactory or dirty clothing—as will be fully realised by those who have attempted a study of the geographical variations of such conditions on the basis of the statistics contained in the annual reports of school medical officers throughout the country.

The Data and their Significance

In all, we have available the medical records of 97 children who were ultimately notified as tuberculous at ages 15–25 years, and a like number for persons of similar ages not known to be so suffering.

INCIDENCE OF INFECTIOUS DISEASES

In Table I. are set out the percentages of children with a previous history of the principal infectious diseases. (The standard errors of the differences in this and subsequent tables have not been tabulated, but the statistical significance of the differences is made evident in the text.)

TABLE I

Incidence of infectious diseases (per cent.)

	Control.	Ultimately tuberculous.
Measles	77·32	80·41
Scarlet fever	7·22	18·56
Diphtheria	3·09	4·12
Whooping-cough	58·76	60·82
Chicken-pox	24·74	31·96
Bronchitis and pneumonia	6·19	8·25

Apart from scarlet fever, there is no evidence of significant difference of prevalence of the specified diseases in the two groups of children. A past history of such infections, therefore, is as likely to be found among controls as among the ultimately tuberculous.

CONDITION AT EXAMINATION

With regard to the actual findings at medical inspection, for some children we have available the results of more than one routine overhaul, so that the subsequent statistics relate to the total number of examinations, *not* the total children. Actually, there were 292 inspections, of the ultimately tuberculous 151 (males 84, females 67) and of controls 141 (males 74, females 67). Although there is a slightly higher proportion of females in the control group, the subsequent figures are set out for the sexes combined because of the rather small numbers available.

(*a*) *External conditions.*—The percentage incidence-rates in each group of the conditions under this heading are shown in Table II.

TABLE II

External Conditions

	Control.	Ultimately tuberculous.
Insufficient clothing	0·71	1·99
Dirty clothing	1·42	5·30
Clean heads	82·98	73·51
Nits	12·77	21·19
Verminous heads	2·13	1·99
Clean bodies	85·11	86·75
Flea-bitten bodies	11·35	7·95
Verminous bodies	3·55	3·97

Although the scanty numerical basis precludes dogmatism, the suggestion would appear to be that dirty clothing, dirty heads, and nits are more prevalent among the ultimately tuberculous. In other features the differences found are unimportant.

(*b*) *Physical condition.*—The incidence-rates for the more important factors are collected in Table III.

TABLE III

Physical Condition

		Control.	Ultimately tuberculous.
Tonsils enlarged		26·44	18·54
Adenoids present or probably present		4·96	3·31
Enlarged submaxillary glands		21·28	17·22
Enlarged cervical glands		6·38	3·97
Teeth	Perfect	7·80	4·64
	Under 4 decayed	27·66	26·49
	4 decayed	41·84	47·68
	More than 4 decayed	22·70	21·19
Oral sepsis		4·26	3·97
Nutrition	Above average	47·52	45·70
	Average	48·23	51·65
	Below average	4·26	2·65
Anæmia		8·51	4·64
Bronchial catarrh		1·42	7·28
Rickets		0·71	2·65

It would appear from the nature of the differences and their statistical significance that, here again, no noteworthy differentiation of the two groups exists except in respect of bronchial catarrh, wherein the difference is more than twice the standard error. It is difficult, however, to assess the exact weight to be laid on this, since no indication is made as to the location or permanence of these adventitiæ and to other chest findings; but since in these 11 cases, 8 were noted at ages under 10 years, 2 at 11, and 1 at 13 years, and since none of these children was notified as tuberculous until at least the age of 15 years, it would be hazardous to attach much significance to this finding and especially unwise to regard these as examples of permanent lesions, the nature of which was missed at such an early age. In all probability the finding may denote no more than a transient bronchial catarrh.

(*c*) *Body-weight*.—The average weights, heights, and ages of the children separated as to sex are shown in Table IV.

TABLE IV

Average weights (pounds), heights (inches), and ages (years)

		Weight.	Height.	Age.
Males	Control	63·59	51·47	10·64
	Ult. tb.	61·42	50·75	10·65
Females	Control	60·14	50·52	10·35
	Ult. tb.	63·57	51·95	10·67

Ult. tb. = Ultimately tuberculous.

In males the weight of the ultimately tuberculous is lower, in females is higher than in the respective control series. It will, however, be noted that there are corresponding differences in the average heights and slight differences of average age. Since body-weight in school life is to such a large extent governed by height, obviously before accurate comparisons can be instituted, allowance for differences of height and age must be made. Since the total number of observations is small, it is impossible to attempt comparisons of body-weights for specified heights and age on the basis of the crude data. From the original observations we have derived the following regression equations relating weight to height and age:—

(1) Boys (control) .. W = 2·83H − 0·18A − 79·99
(2) ,, (T.B.) .. W = 2·66H − 0·19A − 71·51
(3) Girls (control) .. W = 2·62H − 0·08A − 71·56
(4) ,, (T.B) .. W = 2·80H − 0·53A − 76·14

W = weight; H = height; A = age.

From these the body-weights for certain ages and heights have been predicted for each group and are shown in Table V., wherein also the weights of the ultimately tuberculous are expressed as a percentage of the corresponding control figure.

TABLE V

Body-weights for specified age and height, with weights of ultimately tuberculous expressed as percentage of controls

Age.	Height.	Males.		Females.		T.B. per cent. of control.	
		Control.	T.B.*	Control.	T.B.	M.	F.
5	40	32·2	33·9	33·0	33·1	105·3	100·3
7	45	46·0	46·8	45 9	46·1	101·7	100·4
9	50	59·7	59·7	58·9	59·0	100·0	100·2
11	55	73·5	72·7	71·8	71·9	98·9	100·1
13	60	87·3	85·6	84·8	84·9	98·1	100·1

M. = males; F. = female; * Ultimately tuberculous group.

From these figures no gross differences of body-weight would appear to exist between the two groups. The ultimately tuberculous are, while of school ages, in no way inferior in this respect to controls of equal ages and heights.

A further problem arises as to whether these two selected groups of children differ from the general school population of the area. Since it is possible for the two selected groups not to differ one from the other and yet to differ grossly from the general population, we have compared (Table VI.) the actual average body-weights and coefficients of variation with the averages and coefficients of variation in a numerically equal sample of Dundee school-children of the same ages and heights. For each child in the two groups—that is, we have determined the weight for its height and age from a table published in the Dundee school medical officer's annual report for the year ending July, 1927, and compared the derived averages and coefficients of variation (columns headed "expected" in Table VI.) with those calculated from the actual body-weights.

The actual average in each case is lower than the expected figure. While the consistence of the deficit is obvious, there are two noteworthy points in connexion therewith. In the first place, the differences are very small indeed (at the outside 2 per cent.) and statistically quite insignificant. In addition, the general figures for Dundee relate to school-children examined in 1927 and the children in the two groups under investigation attended school long before that. Improvement in the physique of school-children over recent years might account for part of the observed differences. If these two points be considered, it is clear that in this respect there is no appreciable difference between the two series and the general school population of Dundee. With regard to variability, as expressed by the coefficients of variation, while in three out of the four cases the actual exceeds the expected, in no case has the difference any statistical significance.

TABLE VI

Comparison of actual and expected body-weights (averag and coefficient of variation)

		Average.		Act. per cent. of exp.	Coefficient of variation.	
		Act.	Exp.		Act.	Exp.
M.	Control	63·59	64·56	98·5	27·56	26·08
	T.B.	61·42	62·94	97·6	26·39	26·91
F.	Control	60·14	60·44	99·5	27·36	24·54
	T.B.	63·57	64·90	97·9	28·59	27·43

M. = males; F. = females; Act. = actual; Exp. = expected.

A more detailed study of body-weights can be obtained by comparing the weights of these two groups at specified ages and for given heights with the corresponding figures for Dundee. This has been done but, except at age 5 years, where the Dundee figures exceeds that for either group, no notable differences were found.

In a report of the proceedings for 1932–33 of the Joint Tuberculosis Council just issued, the following paragraph occurs (p. 7): "It is to be hoped that sooner or later the Council will initiate research to investigate the statement that it is not the delicate children in tuberculous households, but the more robust, who later develop tuberculosis." While the children in the group examined here do not necessarily come from tuberculous households, it is clear from the above findings that, in respect of those developing tuberculosis at young adult ages, the physique does not differ significantly from that of control or even average children of school ages. Neither under- or over-average physique would appear from our data to predispose to the onset of young adult phthisis.

Summary and Conclusions

In this investigation we have scrutinised the available school medical details regarding two sets of persons, one developing tuberculosis in young adult life, the other free from this disease at that age, the object being to elicit whether such tuberculous people show any prior stigmata by which they might be singled out for special supervision or specialist examination before the onset of manifest disease. It is obvious that if differences did emerge, it might be possible to concentrate specialist diagnostic services —e.g., radiography in this particular instance—on a much smaller number of persons and, correspondingly more economically than if such services had, in the absence of directional findings, to be applied wholesale.

In actual fact, only in two respects have significant differences been obtained. In the prior incidence of scarlet fever and in the presence of bronchial catarrh the excess frequency among the ultimately tuberculous ppears to be statistically significant. With regard to common infectious diseases other than scarlet fever, the observed differences might well have arisen by chance. In the conditions found at school examination, the more frequent occurrence among the ultimately tuberculous of dirty clothing, dirty heads, and nits (indicative to some extent of the quality of maternal care—an important factor in child life) is probably significant statistically.

The physical condition of the children in respect of other factors such as tonsils, adenoids, submaxillary and cervical glands, dental decay, nutrition, anæmia, and rickets does not differ substantially in the two groups, and the differences found, irrespective of statistical insignificance, are by no means consistently in favour of the controls. With regard to the accurately measurable factor of body-weight, our investigation shows no important difference between the controls and the ultimately tuberculous, nor between these two groups and the general school population of Dundee. We cannot, of course, be dogmatic on the basis of this limited experience, but perhaps our essentially negative findings will stimulate others to whom such records are available to try out such an inquiry on a larger scale. What should be emphasised, however, is that if, on more extensive inquiry, the differences found were only of the nature and numerical order found here (but because of the larger numerical basis were statistically significant) it is quite impossible from ordinary routine medical inspection to predict with any degree of accuracy the type of school-child likely to develop tuberculosis in young adult life. If, as is commonly believed, the infection is acquired in earlier life, it would appear from our findings that it does not reveal itself in any way detectable by ordinary clinical methods.

Finally, we would re-emphasise the fact that as this inquiry is of a kind which could be instituted in respect of other diseases if routine inspection were to be generally introduced, careful and accurate recording of medical details is an essential part of the framework of any such scheme. For instance, in an investigation of this nature, more details of physical condition—such as vital capacity readings, chest measurements, and blood-pressure readings—and some details of other features such as the results of intelligence tests and elaborate details as to intercurrent illnesses of all kinds would have added appreciably to the interest and importance of our essentially negative results.

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF MEDICINE

IN this section, Dr. J. A. RYLE (London) being in the chair, a discussion on the ætiology and treatment of

Bacillus Coli Infections

was opened by Prof. D. M. LYON (Edinburgh). He dealt first with the natural habitat of the organism in the large bowel, especially the cæcum and ascending colon, where conditions were most favourable to its growth, and the methods by which it spread. Contrary to former belief, several workers have shown the organism to be capable of penetrating the bowel wall even when in normal condition. The bacilli, it seems, are constantly entering the blood stream from the bowel, and being there destroyed. The urinary tract was commonly infected through the blood stream; it was not however yet explained why the right kidney was more often affected than the left, nor why women are more liable to pyelitis than men. Experiment has shown that the healthy animal has an enormous resistance to the colon bacillus when introduced into the blood stream, and it is difficult to infect the urinary system in this way. Spread of infection took place from lower to upper parts of the urinary tract via lymphatics, and not by urethra nor ureter. Some authors discarded the terms pyelitis and bacilluria in the belief that in all cases there was some invasion of the kidney substance. Important in the ætiology were urinary obstruction and inflammatory lesions of the bowel and the abuse of purgatives. It had been suggested that the non-appearance of organisms in the urine after a dose of cascara might be used as a test of cure. Persistent bacilluria could result from foci of infection in the gall-bladder or appendix. The gall-bladder might be infected either by blood-vessels, lymphatics, or bile-ducts. Hurst has shown that the colon bacillus could grow in the duodenum and stomach when HCl was not secreted and when stomach movement was inhibited; these conditions favoured retrograde infection. Any abnormality which interfered with drainage from the gall-bladder and any focus of infection elsewhere—e.g., in the appendix—assisted in the production of cholecystitis. While the bacillus readily entered the blood stream, its persistence and growth there was a rare occurrence. Many alleged cases of coli septicæmia were in reality simply the overflow of bacteria from some local focus, such as the appendix or gall-bladder.

Prophylactic measures consisted in the avoidance of debilitating conditions and ensuring free drainage in the urinary and biliary tracts. Constipation should be treated, though severe purging was likely to aggravate an infection. So-called intestinal antiseptics were probably of little value; the best in this class were calomel and sulphur. Liquid paraffin and agar and high colon lavage were helpful. Protein and fat should be restricted in the diet. Prof. Lyon believed treatment with vaccines to have been disappointing, probably because a large number of different organisms were covered by the term colon bacillus. For the same reason there were difficulties in getting good results from bacteriophage or antisera. In the treatment of acute urinary infections the essentials were rest, warmth, and copious drinks; flushing of the urinary tract was held by many to be the most effective measure. Alkalis were helpful in the early stages; several hundred grains of potassium citrate and sodium bicarbonate could be given in the 24 hours. The urine should be kept alkaline throughout the day, and for several days after the temperature had come down to normal; but not long enough to cause depression. In children the urine should be kept mildly alkaline for some weeks, and in pregnancy alkalis should be given till the end of term. If alkalis fail to relieve, acid might be tried or alternate courses of each for seven to ten days. Acid sodium phosphate would usually convert alkaline urine to acid. Ammonium and calcium chlorides produced stronger acidity but were liable to cause nausea and to irritate the urinary tract. Hexamine, which acted by liberating formaldehyde in an acid urine, probably did no more than inhibit the growth of the colon bacillus. To avoid interaction before reaching the urine acid and hexamine should be given at different times; in acute infections this combination was too irritant to the urinary passages and should be avoided.

Many other antiseptics had recently been introduced —e.g., the dyes of the pyridine and the flavine series; in chronic cases a succession might be tried. For the resistant resort should be had to the ketogenic diet; it had proved successful in 50 per cent. of one series which had resisted other methods. Treatment of chronic biliary infections where surgery was not advisable lay in measures likely to increase the flow of bile, such as copious drinks, magnesium sulphate direct into the duodenum or by mouth. Its action was enhanced by a preliminary *injection of pituitrin.* Olive oil and sodium salicylate could be used as cholagogues. Hexamine was given, but its mode of action in an alkaline medium was difficult to explain. In coli septicæmia the urgent necessity was to search for a focus of infection.

Dr. Cuthbert Dukes (London) discussed his observations on a large series of cases which had had extensive pelvic operations, chiefly for rectal carcinoma. Although the renal tract was normal before operation, in a large proportion it became infected afterwards by the colon bacillus. Retention of urine was the most important factor. Minor defects of function, leading to a reduction of urea clearance to 40–50 per cent. of normal, or an increase in blood-urea to 50–60 mg., did not predispose to infection. Urinary antiseptics had no effect on the *course* of the disease; infection occurred just as readily when they were given prophylactically. Alkalis were found to have a *slightly* beneficial effect.

Dr. C. M. Wilson (London) had found the ketogenic diet superior to other methods in the treatment of chronic urinary infection. Of 100 cases, 12 failed; the remaining 88 were cured, but 15 relapsed later. With such a high proportion of *initial* successes it was a moot point whether or not a preliminary surgical overhaul was advisable or not. For a success there were two essentials: an intense ketosis, and a reduction of the pH of the urine to about 5. He advised a diet containing 300 g. fat, 10 g. carbohydrate, and 50 oz. fluid. The patient should not be kept in bed. The diet was kept up for at least one week after the urine became sterile. If the urine failed to give a positive ferric chloride test by the fourth or fifth day of treatment success was unlikely. Tests should be made morning and evening, as ketones might be absent in the morning specimen. Relapse might occur after some months; if then a surgical lesion could be excluded the treatment should be repeated.

Dr. Hinds Howell (London) said that using this form of treatment he found it very difficult to devise a diet containing less than 25 g. carbohydrate; or to get a urinary ketosis giving a pH of less than 5·8 and a strongly positive ferric chloride test. Ammonium chloride up to grs. 125 daily in addition to other measures might bring the pH down to 5. Avoidance of alcohol and vigorous exercise were important in preventing relapses.

Dr. E. P. Poulton (London) said he found a more marked ketosis to occur if more protein was given in the diet. Recently he had used calcium chloride (grs. 7½ six times daily in pill form) as an alternative to dieting.

Dr. W. H. Oxley (Poplar) said he found it difficult to get patients to keep to the diet, and asked if β-oxybutyric acid was the antibactericidal principle produced by the treatment; if so, it might be possible to get results by giving this alone.

Dr. Dorothy Hare (London) mentioned the capillometer as a simple method of testing urinary acidity. As a preliminary to treatment she believed X ray examination of the kidney after intravenous uroselectan was advisable, but the trauma of a surgical investigation might be detrimental.

Dr. E. H. White (Bournemouth) stressed the importance of large quantities of fluids by mouth in the treatment of the acute case. The free drainage of the renal tract thus produced was important in preventing acute infection from becoming chronic.

The Chairman classified cases of urinary infection into four groups: the acute case with and without obstruction, and the chronic case with and without *obstruction. He believed that by thorough treatment* of the acute case, without obstruction with much fluid and much alkali, there would be fewer chronic cases. More than 400 grains of alkali could be given daily, since it was extremely difficult to produce an alkalosis in a patient *with coli pyelitis.* It was, he said, easy to overlook an early acute pyonephrosis and the *possibility should be considered where the symptoms* were predominantly unilateral.

Dr. S. C. Dyke (Wolverhampton) mentioned two cases of so-called pyelitis which he had examined post mortem; in one case the kidney contained a septic infarct, in the other there were multiple cortical abscesses. He found that 50 per cent. of women over 50 had pus and colon bacilli in the urine, without symptoms. Did such people, he asked, need treatment; *and need anything be done for those showing* a simple bacilluria?

Dr. G. W. Goodhart (London) thought that the available methods for detecting the bacillus in the blood might be defective, and that actually a persistent slight bacteræmia might exist, due perhaps to a constant leakage of organisms from the rectum into the blood stream.

Dr. Wilson in reply said that unless the urinary *pH was reduced to less than 5·8* the ketogenic treatment would be ineffective. A very low carbohydrate intake was rendered possible by giving fruit.

Prof. Lyon said that good results could often be obtained by simple methods of treatment. The use of β-oxybutyric acid without carbohydrate restriction would, he thought, be of no value.

SECTION OF PATHOLOGY

At a meeting of this section, with Prof. J. W. Bigger (Dublin) in the chair, a discussion on

Œstrus-producing Hormones

was opened by Prof. E. C. Dodds (London). It was perhaps unfortunate, he said, that considerations of laboratory convenience had caused all the work on these hormones to be done on rats and mice, so that any discussion on them automatically called up a mental picture of small rodents. Active material had at first been prepared from ovaries by extraction with volatile solvents. Later the placenta had been found a useful source, and finally it had been discovered in the urine of pregnant women, where it was relatively uncontaminated and could be studied. The material was known to contain carbon, hydrogen, and oxygen, and at a later date was proved to belong to the sterol group possessing in common with them a partial hydrogenated phenanthrene ring system. The two most important forms of the hormone occurring in the urine are ketohydroxy-œstrin and trihydroxy-œstrin. Further interesting chemical compounds may be obtained by a process of hydrogenation of ketohydroxy-œstrin. The first of these, dihydro-folliculin, is many times more potent then the original substances. Still further hydrogenation leads to a compound resembling the male sex hormone. Other œstrus-producing substances have been found from natural sources. *Plants contain a compound called* tokokinin which has the same type of structure as œstrin. It has also been found that coal and certain mineral fuel oils contain œstrus-producing substances. According to some this power is due to the tokokinin of prehistoric forests, but other explanations are possible. Whilst ketohydroxy-œstrin itself has not yet been synthesised a series of synthetic œstrus-producing agents has been manufactured in the laboratory (Cook, Dodds, Hewett, and Lawson, 1934, Proc. Roy. Soc. Sec. B., cxiv., p. 272) and these are in the main derivatives of phenanthrene and dibenzanthracene. Vitamin D in very large doses was also capable of producing œstrus. Thus the naturally occurring œstrus-producing hormones were linked on the one hand with carcinogenic substances and on the other with vitamins and plant sterols.

All female animals responded to these hormones if enough were given, the response varying directly with the body-weight. C. Kaufmann had shown that the administration of œstrin with corpus luteum hormone produced menstrual changes in the uterus even of ovariectomised women. The results of his work had made it possible to state definitely that this natural phenomenon could be produced at will in castrated women. Enormous doses were necessary in ovariectomised women, but in animals a series of regular cycles could be induced after castration and then the amount required was nothing like so great as the initial dose. Much smaller quantities were necessary if the ovaries were present, and the changes might be produced by œstrin alone. Kaufmann had also demonstrated the typical picture of cystic hyperplasia of the endometrium produced by very large doses spread over several weeks. The practical application of this work was that the menses might be produced in cases of primary and secondary amenorrhœa. Very good results from 50,000 mouse units twice weekly had been reported in menopausal cases, and chronic inflammations of the vulva associated with the menopause and senility also responded well. Corpus luteum hormone controlled certain types of menorrhagia, and patients subject to abortion had been brought to term by its aid. The biochemist and biologist had placed an entirely new set of weapons in the hands of the practitioner.

Mr. A. S. Parkes, D.Sc. (London), said that the sexual cycles of all mammals had the same essential features: a phase characterised by the growth and ovulation of the Graafian follicle, and a second phase characterised by the growth of the corpus luteum. Œstrus-producing hormones were essentially associated with the first phase, and the changes characteristic of it could be produced by the injection of the hormone into ovariectomised animals: for instance, in the baboon, the perivulval skin showed extreme swelling. Œstrus-producing hormones sensitised the uterus to the action of progestin, which could not produce its effect unless the womb had been brought into the condition of œstrus by œstrin. Ketohydroxy-œstrin was stronger, weight for weight, than the other forms, but it was very doubtful whether there was any real biological difference. It was possible to say definitely that the œstrus-producing hormones would produce in the ovariectomised or inactive animal all those changes normally associated with the growth of the follicle.

Dr. H. Gardiner-Hill (London) said he had been able to use Prof. Kaufmann's extracts clinically. Two methods had been adopted: a series had been treated exactly as Prof. Kaufmann suggested; œstrin during the first half of the cycle and luteal hormone in the second half. Another series had been treated with œstrin alone. Four cases of anorexia nervosa with amenorrhœa and six cases of amenorrhœa otherwise normal had had the full course. Only one of the normal group had failed to respond. All the cases of anorexia nervosa had menstruated after treatment. None, however, had menstruated a second time spontaneously. Of five cases treated with œstrin alone two had anorexia nervosa. Three responded but the reaction was delayed. One patient had three further spontaneous normal periods. Two patients with primary amenorrhœa, aged 19, had also been treated; one had failed to respond at first but had menstruated after the second and third courses. The other had had four courses; there had been no menstruation, but definite puberal phenomena were appearing. The extracts undoubtedly controlled climacteric symptoms. A woman of 62, treated successfully for migraine, had begun to menstruate again.

Dr. J. M. Robson (Edinburgh) spoke of the effects produced on the uterine muscle. There was maximum activity during menstruation. Response to oxytocin was at its highest then, and also showed a marked fall at the onset of pregnancy. In the later stages of gestation there was a gradual rise. The dose required to produce contraction was the same in the mouse, the rabbit, and the woman. The reactivity was controlled by various factors, including the luteal and œstrus hormones. Œstrin injected into the ovariectomised animal would raise reactivity to the parturition level. Similarly, a pregnant animal could be affected by œstrin. There was therefore hope that the œstrus hormone might have value in obstetrics. A fairly high concentration of œstrin must be maintained. In woman it was fairly rapidly destroyed, so that dosage must be large and given at intervals of a few hours.

Dr. P. M. Bishop (London) described two cases treated. One woman had suffered severely from flushes after artificial menopause and had been greatly relieved by œstrin. A case of secondary amenorrhœa, lasting 18 months, had had a period ten days after the first injections and her uterus had shown typical histological changes. He described a method of diagnosis of pregnancy by extracting œstrin from the woman's urine and injecting it into an animal which had had an endometrium graft into the anterior chamber of the eye; the graft could be seen to blush under the influence of œstrin. The diagnosis could be given within three or four hours, and the test seemed worth following up.

Mr. L. C. Rivett (London) classed primary amenorrhœa and intrinsic dysmenorrhœa together as indications of failure of development. There were two classes of intrinsic dysmenorrhœa: the first type of girl had malaise, headache, and sickness rather than much pain, from the very onset of menstruation. This must be a hormonal disturbance. The second type only began to develop severe colicky pain after three or four years of normal menstruation and might be accounted for by some developmental failure of the muscle. From the clinician's point of view the accepted idea of the time of ovulation—12–17 days after the period—did not correspond with experience. He suggested that this ovulation was the discharge of a spent ovum, and that the only ovum capable of being fertilised was one released by stimulus of intercourse, as was known to occur in the rabbit.

Dr. Marius Tausk (Holland) spoke of the action of œstrin in males. It was normally produced in the testis and excreted in male urine. It acted on the smooth muscle of the male genital tract; the seminal vesicles underwent marked increase in size when castrated animals were injected with œstrin. A normal male so injected suffered retardation of development of the testis, probably via the pituitary. This result marked the effect on the secondary sexual elements. In addition to muscular growth of the vesicles there were epithelial changes, and there might be some connexion with the prostatic enlargement of old age. The male hormone counteracted the effects. Unfortunately there was a confusion of units of measurement of these hormones. Dimenformon was about twice as strong as the international standard, but its benzoate was about the same, so that 200 units given by Prof. Kaufmann was about the same as 200 international units. Slight impurities in a hormone might materially alter the biological effects, and hence dosage by weight was still far from practicable.

Prof. D. Campbell (Aberdeen) said that treatment of hormone deficiency by œstrin could only be replacement therapy, comparable with insulin or thyroxine. Real treatment might be attained by means of the gonadotropic substance produced by the anterior pituitary. He showed a series of slides illustrating this action, and suggested that it would be worth while to try the effect of small doses of anterior pituitary for therapeutic purposes.

SECTION OF PÆDIATRICS

With Dr. Hazel Chodak Gregory in the chair this section held a discussion on

Osteomyelitis

Prof. John Fraser (Edinburgh) said that a statistical survey carried out by C. P. G. Wakeley in the decades 1900–1910 and 1920–1930 seemed to show that osteomyelitis was a disappearing disease. There had been, however, a curious increase in the last year, as shown by the figures of the Edinburgh Royal Infirmary, where the figures for the decade May, 1924, to May, 1934, were :—

3 .. 4 .. 2 .. 3 .. 3 .. 4 .. 5 .. 7 .. 5 .. 12 (48 cases).

This increase, he suggested tentatively, might be due to the unusually dry summer.

After emphasising the fact that osteomyelitis was only a local symptom in a general septicæmia, Prof. Fraser discussed the question why the infection should localise itself so constantly in the metaphyseal areas of long bones. This localisation had been attributed to a profuse but rather stagnant blood-supply, to the tissue activities of rapid growth, and to exposure to trauma. His own view was that an explanation lay in the large amount of reticulo-endothelial tissue present, which a growing body of evidence seemed to show was one of the most important defensive mechanisms of the body. Turning to treatment he said that he was becoming more and more conservative. The gutter operation had proved disappointing ; diaphysectomy appeared wholly wrong in principle and he preferred a modification of the Starr technique, perforating the cortex of the medulla with a series of holes one-eighth of an inch in diameter at intervals of a quarter of an inch and lightly packing with an emulsion of acriflavine 0·1 per cent. and potassium citrate 2 per cent. in liquid paraffin ; the limb then being put up in a light plaster for 14 days. General measures included immuno-transfusion, but he had not had much success with sera. His mortality in these cases had been 23·2 per cent.

Mr. H. Tyrrell-Gray (London) said he was convinced that attention should be concentrated on the septicæmia ; he had entirely abandoned operative treatment and had only had one death in five years. He exhibited X ray photographs and charts illustrating the resolution of the bone lesions under the treatment introduced by D. N. Nabarro by means of intravenous injections of mercuric perchloride gr. 1/40-1/16 and intramuscular injections of antistreptococcal serum. Unlike Prof. Fraser he had found blood cultures positive in many cases ; he had also been struck by the fact that the secondary abscesses were always staphylococcal even when the primary lesion was streptococcal.

Mr. H. W. S. Wright (London) said he believed that osteomyelitis, like rickets, could be abolished if only enough care were taken ; he drew attention to the remark made by Sir Cuthbert Wallace, when this subject was last discussed by the Association, that it was primarily a disease of dirt. Bone localisation was often a late symptom of the septicæmia ; he thought Prof. Fraser under-estimated the mechanical factor in causing this localisation ; the work of Hunter on the different blood-supply of the epiphysis and diaphysis had been completely vindicated and stagnation at the cartilage must occur. He advocated early, accurate, and limited interference by means of small drill holes with the minimum of interference with the marrow. He agreed that the gutter operation and diaphysectomy were bad, but thought that plasters were often left on too long, and preferred the Carrell-Dakin treatment in some cases.

Dr. Leslie Cole (Cambridge), speaking as a physician, laid stress on the importance of a minute examination of the bones in cases of unexplained pyrexia and on the value of a four-hourly temperature chart, blood counts and blood culture in the differential diagnosis. He had not noticed the increase in cases mentioned by previous speakers, but there had been a similar increase in tetanus which he attributed to the dry summer. Serum had not proved of value in his cases, but a recent report from Berlin claimed that convalescent serum was of great value. He was interested in Prof. Fraser's theory about the part played by the reticulo-endothelial system, but felt that splenic complications should be more common if this were involved.

Mr. S. A. S. Malkin (Nottingham), speaking as an orthopædic surgeon, referred especially to the importance of preserving function. Both the gutter operation and diaphysectomy were unsatisfactory in this respect. In his opinion radical sequestrectomy was not performed often enough and in ten cases where this was done long-standing sinuses had cleared up completely.

Mr. W. A. Mein (Bournemouth) discussed the original focus of infection and said he had been much struck by the number of cases of acute infections such as appendicitis and osteomyelitis, which came on a year or two after removal of the tonsils. He advocated surgery and described the technique he employed. He believed irrigation to be of great value.

Dr. E. L. Goffe (Kingston-on-Thames) asked for further details of Mr. Tyrrell-Gray's methods.

Mr. Robert Kennon (Liverpool) expressed astonishment that a treatment so contrary to surgical principles should have been effective ; surely if pus were present it was the surgeon's duty to let it out. He demonstrated where to feel for points of maximum tenderness, and said that a great danger of immobilisations in plaster was the difficulty of diagnosing secondary foci.

Dr. F. J. Poynton (London) commented on the anxiety of most physicians to hand these cases to the surgeon, while the latter he now understood was returning them to the physician. Acute lymphatic leukæmia had, in his experience, been mistaken for osteomyelitis with disastrous results.

Mr. W. J. Eastwood (Liverpool) said that he was in favour of the gutter operation ; drilling had been unsatisfactory in his cases because the involucrum round the holes made subsequent sequestrectomy harder and the number of secondary abscesses increased, while the drill holes became clogged with discharge. The gutter should not be along the whole length of bone where the periosteum was stripped up as a good deal of this was the result of œdema.

Prof. FRASER, replying, said that this discussion, like the previous one, revealed that there was still no unanimity of opinion. He stressed the sharp distinction between the streptococcal and staphylococcal infections; the former killed quickly or not at all, while the latter frequently killed after a long time. His experience with mercury had not been satisfactory and he had seen albuminuria following its use. He had never been convinced of the effect of trauma as a cause. Difficulties in diagnosis between scurvy and osteomyelitis had occurred in his experience. He had gradually become more and more conservative in his methods and felt that Mr. Tyrrell-Gray's work was on the right lines.

Mr. TYRRELL-GRAY, replying to questions, stated that the details of treatment could be found in the published work of Nabarro. In his experience the staphylococcal or streptococcal nature of the infection did not matter; in five years he had only had one death and no case of sequestrectomy. He preferred mercuric perchloride to mercurochrome and had seen no signs of poisoning except gingivitis. In some cases treatment had lasted as long as six weeks with intravenous injections given every other day; other cases required daily treatment. He was confident that the death-rate could be greatly diminished by conservatism.

SECTION OF OPHTHALMOLOGY

THE President, Mr. LESLIE PATON (London) being in the chair, Mr. A. D. GRIFFITH (London) opened a discussion on

Headaches

Speaking as an ophthalmologist, he said that 24 per cent. of his private patients came to him because of headache. The history of the headache helped him to determine whether it was of ocular origin. He first paid attention to the situation of the pain; ocular headache was generally (60 per cent.) frontal or orbital ("pain behind the eyes"), more rarely it was occipital or temporal, almost never vertical. The time of onset was also of importance. Ocular headache comes on at the end of a day's work, though it may be present as an early morning headache following the misuse of the eyes on the preceding day. The delay in the onset of headache is illustrated by the week-end headache—probably due to the fact that the patient makes every possible attempt to carry on during the week. The mechanism of headache was seen at its simplest in hypermetropia; tonic contraction of the ciliary muscle is a permanent condition in these cases and is exaggerated by close work. Muscular fatigue is thus induced. The hypermetrope with an unequal error in the two eyes has to exercise an unequal degree of accommodation. In astigmatism unequal contraction of the ciliary muscle is brought into action to neutralise the corneal astigmatism by inducing lental astigmatism in the opposite direction. This mechanism may be overdone, producing an artificial astigmatism in the contrary direction to the original error. The question of contraction of iris muscle as a cause of headache was, he thought, debatable. The earlier cinemas were more productive of headache than the modern ones. The abolition of flicker, the reduction in the size of the screen, the maintenance of a certain amount of general illumination, and the long corridors with gradually diminishing intensity of illumination, all tended to diminish excessive action of the pupil. In considering headaches due to abnormalities of the extrinsic muscles of the eye, he stressed the dangers of over-correction. Vertical imbalance is more productive of discomfort than horizontal. As a rule it was the poorer eye which tended to deviate upwards; when the two eyes were of equal refraction the hyperphoric eye was usually not the "master eye." In correcting heterophoria, he did not rely so much upon the Maddox rod as upon a simpler plan. The patient is made to gaze on a distant spot of light with a red glass before his right eye and a green before the left; if the red and green lights are mixed together his heterophoria does not need correction by prisms; if he sees the red and green separate the weakest prism which will enable him to mix them is to be taken as the maximum to be prescribed. In occipital headache the pain was referred from contraction of the frontales muscles caused by the attempt to screw up the eyes; the pull is transmitted along the epicranial fascia to the occipital muscles.

Dr. WILFRED HARRIS (London) contributed a paper on headaches in relation to ocular conditions. In the past, he said, it was usual to ascribe headaches to rise of intracranial pressure and to explain migraine as the result of influences, such as pressure acting upon the recurrent meningeal branches of the trigeminal nerve supplying the dura. Yet large areas of the dura were insensitive to surgical manipulations, whilst the sympathetic nerve supply was of doubtful significance in the conduction of pain. Clinically there was no doubt that a sudden rise of intracranial pressure does produce violent headache. This is seen in subarachnoid hæmorrhage, and in distension of the ventricles. General distension causes pressure which is transmitted through the cerebral substance, and it is an open question whether the pain thus produced is due to irritation of the meningeal nerves or of brain tissue itself, such as the thalamus. Speaking of migraine, there was, he said, little doubt that in the preliminary stage (aura) there was arterial constriction; narrowing of the central artery of the retina had been observed, followed later by throbbing and dilatation of the vessel. This fact suggested that a similar constriction of the cortical vessels, especially in the occipital region, might be concerned in the production of the hemianopia or of the scotoma scintillans, and the subsequent headache due to engorgement of the vessels and cerebral compression therefrom, the vomiting itself being suggestive of intracranial pressure. True migraine, he said, rarely had any direct connexion with ocular conditions. Migraine was a periodic headache, coming on at irregular intervals, of variable duration, generally associated with nausea and vomiting, together with sensory disturbances such as aura, scintillating scotoma, hemianopia, tingling along the lips and tongue, sometimes a temporary aphasia and weakness of an arm, rarely the leg. All these were obviously cerebral effects, totally different from the headache of refractive conditions. Often there was a family history of migraine, and other neuroses might be present in the family. Speaking of headaches of ocular origin, Dr. Harris pointed out that a difference in apparent size of the images perceived by the two eyes with a consequent difficulty in stereoscopic vision, has been recently advanced as a cause. He enumerated the conditions affecting the interior of the eye which caused pain and stressed the persistence of neuralgia in cases of herpes ophthalmicus. In particular he drew attention to the headache of cerebral arteriosclerosis, which the ophthalmologist can recognise by the changes in the retinal vessels. Such headaches were apt to be more severe at night. One pitfall, which was apt to send the patient from one specialist to another, was the pain in the condition he had described as maxillary neurosis. This was a chronic neuralgia of the jaw. In many cases the pain had started after severe dental extraction, and being unilateral was thought to be due to some piece of decayed stump or diseased bone. There often was complaint of flushing over the cheek, and though all the teeth might be removed, the antrum washed out, turbinal bones removed and glasses prescribed, the pain continued unabated. It was not paroxysmal or tic-like in character, but more or less persistent, though varying during the day. No operative treatment was of any value, and alcohol injection should be refused.

Dr. C. Worster-Drought (London) spoke of headaches in relation to ocular conditions from the standpoint of general medicine. Of 158 cases he had seen for persistent headache, no less than 78 were suffering from migraine, 16 had apparent cerebral arteriopathy or hyperpiesis without any evidence of nephritis, 4 had chronic nephritis. A group of 16 cases had no demonstrable organic condition, their general behaviour justifying the diagnosis of neurosis. Other groups were smaller: cerebral tumour, 8; occipito-cervical fibrositis, 6; gastrointestinal disorders, 4; effect of head injury, 4; error of refraction not adequately corrected, 3; high myopia with persistent headache in spite of constant use of glasses, 3; diabetes mellitus, 3; accessory sinus disease, 3; spontaneous subarachnoid hæmorrhage, 3; unsuspected chronic encephalitis, 2; pyorrhœa, 2; masked hyperthyroidism, gross deflection of nasal septum, and pelvic disease (tuberculous tubes found at operation), 1 each. In migraine he was satisfied that refractive errors played little or no part. Cerebral arteriopathy was apt to be overlooked, especially when the blood pressure was not unduly raised. In these cases the headache might be of an intermittent "bursting" character (a type usually associated with hyperpiesis); pain of a "numb" character might also be complained of, together with a lack of "clearness." Dizziness was a frequent symptom. A point to be stressed was the fact that the state of the palpable arteries and even the height of the blood pressure was no criterion of the condition of the arteries of the central nervous system. Hence the value of an ophthalmoscopic examination. In persistent headache associated with high myopia the provision of apparently suitable glasses generally failed to give relief; no other cause for the headache could be found and use of the eyes aggravated the pain. The headache was fronto-occipital in distribution, practically continuous, present on waking in the morning, and worse as the day advanced. Headache from accessory sinus disease, in the experience of the general physician, was not common. His cases of spontaneous subarachnoid hæmorrhage all complained of headache, usually occipital, but intense backache, pain in the neck, general pain or delirium was the predominant symptom. Apart from retinal arteriosclerosis in the elderly subjects, the most common ophthalmological finding in these cases was blurring of the margins of the discs, especially on the nasal side, and occasional small retinal hæmorrhages.

Mr. Maurice Sorsby (London) said that to the rhinologist headaches were a case of empty barrels making the loudest sound, for it was largely the air-filled sinuses which he had to incriminate. The anatomical basis was not the empti
but the fact that the sinuses, actin
nasal cavities, increased enormous
of mucous tissue supplied with
nerve-endings. Not only were t
divisions of the trigeminal nerve
over the nose and sinuses, but
ganglion was situated in a vuln
underneath the nasal mucosa.
a bundle of nerves. Consider
basis of the pain, there were,
(*a*) pressure, (*b*) vacuum, (
Pressure headache was seen in
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Pain was severe, wi
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forms of headaches was to be explained on the nuclear distribution of the Vth nerve. One form of headache which was puzzling to him was that seen after lumbar puncture. A grave form was that seen in patients under 40 suffering from hyperpiesis and showing soft retinal exudates. He agreed with Dr. Harris that there was no true migraine except with prodromal symptoms; migraine with vomiting seemed to constitute a distinct entity.

Mr. STENHOUSE STEWART (Hull) stressed the significance of muscle imbalance in headaches and discussed the methods to be employed in the prescribing of prisms.

Mr. A. J. BALLANTYNE (Glasgow) attached importance to imbalance, but pointed out that the nature of the patient's work was a deciding factor in precipitating the headache. He drew attention to the development of astigmatism against the rule with advancing years.

IRELAND

(FROM OUR OWN CORRESPONDENT)

CRIMINAL LAW AMENDMENT BILL

A FEW years ago the late Government of the Irish Free State appointed a small committee, containing representatives of the professions of the church, law, and medicine, and some social workers, to consider the existing laws governing the relations of the sexes, and make, if thought fit, recommendations for amendment. A report was submitted by the committee, but, for some reason which has never been stated, it has not been published. The Criminal Law Amendment Bill, which passed its third reading in the Dáil last week, is said to be based on this report, although in many points it is believed not to be as far-reaching as the committee desired. The most important changes proposed in the Bill concern the "age of consent," the suppression of prostitution, and the sale or importation of contraceptives.

By previous Acts it was a felony to have unlawful sexual knowledge of a girl under 13 years, and a misdemeanour to attempt to have such knowledge. In the present Bill it is proposed to make the age in each case 15 instead of 13. By previous Acts it was a misdemeanour to have or attempt to have unlawful sexual knowledge of a girl above the age of 13 years and under the age of 16 years. It is now proposed to make the ages 15 and 17. The "age of consent" will, therefore, be 17 if the Bill should become law. The period during which a prosecution for this offence may be commenced is to be prolonged from 3 months to 12 months. Section 16 of the Bill deals with solicitation, and Subsection 4 runs as follows:—

> "Every common prostitute who is found loitering in any street, thoroughfare, or other place and importuning or soliciting passers-by for purposes of prostitution or being otherwise offensive to passers-by shall be guilty of an offence under this section and shall on summary conviction thereof be liable, in the case of a first such offence, to a fine not exceeding £2, or, in the case of a second or any subsequent such offence, to imprisonment for any term not exceeding six months."

This clause is modelled on a local Dublin police law. An amendment to substitute "person" for "common prostitute" was rejected.

The section of the Bill which has given rise to most interest, and has indeed most importance to the ordinary citizen, is Section 17, which provides for the prohibition of the sale and importation of contraceptives. It declares that "it shall not be lawful for any person to sell, or expose, offer, advertise, or keep for sale or to import or attempt to import into Saorstát Eireann for sale, any contraceptive." An offence under this subsection will be punishable by a fine not exceeding £50 or to imprisonment for not more than six months or to both such fine and such imprisonment. Moreover, contraceptives are to be deemed to be included among the goods included in the Table of Prohibitions and Restrictions Inwards in Section 42 of the Customs Consolidation Act, 1876, and the provisions of that Act (as amended or extended by subsequent Acts) shall apply accordingly. The word "contraceptive" is defined as meaning "any appliance, instrument, drug, preparation or thing, designed, purposed, or intended to prevent pregnancy resulting from sexual intercourse between human beings."

These provisions of the Bill gave rise to some criticism in the correspondence columns of the daily press, but were criticised in the Dáil by only one member, a medical deputy. He pointed out that, rigorous as the section appeared to be, it was unlikely to stop the traffic in or use of contraceptives but might readily drive the trade underground. In so far as the provisions might be effective they would probably lead to an increase of such crimes as criminal abortion and infanticide. It was recognised that the moral judgment of the majority of the people of Ireland condemned as immoral the use of contraceptives as a measure of birth control, but there were many people who did not share that view. It was neither practicable nor just to impose the moral views of part of the population by statute on a minority In certain cases, by no means rare, a virtuous married woman was faced with the advice that a pregnancy might endanger her life or gravely prejudice her health. She had at present the alternatives of abstention from marital intercourse and of contraceptive precautions. Abstention might be almost impossible in some cases, and if it were attained might lead to grave nervous disturbances and unhappiness to both wife and husband. To deny the other alternative was unjust to those whose consciences allowed them to adopt it. Notwithstanding this protest the section was carried and remains part of the Bill.

It is not clear that the Bill makes any real advance in the protection of young girls, while, on the other hand, it appears to open a wider door to the practice of blackmailing. Indeed, the notion underlying the Bill seems to be that the male is always the aggressor. Many girls of 16 to 17 are, however, precocious, and it is probable that in most cases of licentious conduct between boys and girls of the same age it is the female who seduces the male. A young lad of 16 found guilty of carnal knowledge of a girl of the same age will be liable to a sentence of penal servitude, while the girl who may have been the tempter has committed no offence known to the law.

VIENNA

(FROM OUR OWN CORRESPONDENT)

IRRADIATION IN UTERINE CANCER

Dr. Simon, reporting from the first gynæcological clinic of Vienna University, at a recent meeting of the Gesellschaft der Aerzte, reviewed the results of cases treated by irradiation at that clinic in the years 1926–28. Of 10 patients with cancer of the cervix, belonging to the group I. or II. of the usual classification, 4 are still alive and without symptoms, having had only primary irradiation. Of the inoperable cases (group III. or IV.) there were 110 under treatment, and only 14 of these are alive and without symptoms. Operations followed by irradiations were done in 115 cases, of which 49 per cent. can be deemed cured. The frequency of recurrences in irradiated cases is 12 per cent. in the second year of observation and 9 per cent. for the third year, whilst it is 6 per cent. in cases with post-operative irradiation. It is not feasible, however, to compare these two groups of patients, for they were chosen from different standpoints. Of 5 cases of cancer of the vulva treated by irradiation 1 only was cured; of 11 of cancer of the vagina 2 were cured; of 11 of cancer of the corpus uteri 3 were cured; of 23 cases irradiated after operation 19 were cured; and of 14 cases (not operated on) with cancer of the ovary 1 only was cured, 2 being improved. It appears that the second and third years show the highest figures of recurrence.

In a report from the radiotherapeutic institute of the city of Vienna, presented at the same time, Dr. Schloss gave the results of observations based on a two-year term; they had 96 women with malignant disease of the sexual organs, verified histologically. Primary irradiation resulted in 68 being alive after two years; only 46 are without symptoms, 6 are doubtful. At this institute also, groups I. and II. gave good results, group III. gave about 35 per cent. cures, and group IV. no cure at all (cancer of the cervix). With cancer of the corpus, the vagina, or the vulva the results were very much like those of Dr. Simon. Prof. Adler emphasised the excellent effects obtained by the combined method of operation followed at once (on the operating table) by X ray or radium therapy. Up to 36 per cent. five-year cures have thus been obtained, whilst operative mortality of the "extended vaginal radical operation" of Wertheim-Schanta is only 3 per cent.

A VENERABLE HOSPITAL

In August the well-known Allgemeines Krankenhaus, or general hospital, of Vienna, which for so many years—indeed, generations—was the Mecca of students of medicine from all parts of the world, will celebrate the 150th year of its existence. It was founded by the Emperor Joseph II., who was at that time (1784) considered the most advanced and liberal ruler, and was almost the originator of democratic ideas in Central Europe. The jubilee festivities, however, will not be held this year; on account of the difficulties now prevailing in Central Europe—of all sorts and kinds—it is intended that the August celebrations shall be purely domestic, and that the proposed meeting of former pupils of the hospital shall be postponed until next spring. Invitations for this meeting will be sent out to all the professors and students whose names are known, and the Government, as well as the medical faculty of Vienna, will do their best to make the affair a real success from every point of view. It is interesting to note that the building practically reached its present size 150 years ago, when it was first erected. Only a few additional extensions have been made in later years within its spacious *Hof* (garden-grounds), among them the famous tower-like building for the care and cure of the mentally afflicted, called *Narrenthurm* (fool's tower), an outstanding feature of the hospital. The old general hospital, with its 1800 ordinary beds and 600 reserve beds, is now in close connexion with the "new" hospital, where the splendid clinics for materia medica, rhino-laryngology, children's diseases, surgery and obstetrics, and neurology are located. Gradually the old hospital, which outwardly retains its antique appearance, has been inwardly transformed into a modern fully equipped institution.

POLAND

(FROM OUR OWN CORRESPONDENT)

THE FLOODS

THE recent floods have been worse than any for over a century. Whole villages have been destroyed, fields are lying covered with ruined crops, and there are people who have lost everything they possess. Financial assistance is being organised, but there is still another misfortune which threatens these unfortunate people—the outbreak of an epidemic. With this in view preventive measures have been carried out since the beginning of the floods by the department of health of the Ministry of Social Service.

The Minister and the head of the department of health paid personal visits to the flooded provinces in the early days of the disaster so that they might the better judge of the situation and decide on the steps to be taken. The department is in touch with the flooded areas by telephone and wireless, and has been able immediately to take steps to cope with new developments. All the chief officials of the department and their sanitary inspectors were sent to help in the work of rescue, and leave was cancelled for all members of the administration of the sanitary service who might help on the local rescue committees. Even the general practitioners of the districts were mobilised and sent to the flooded regions. The population were forbidden to drink water from rivers or wells which had been muddied or contaminated, and warnings were issued against drinking water or milk which had not been boiled. Good drinking water, which often had to be brought from a distance, was distributed among the people.

When the floods had subsided the purification and disinfection of the wells with chlorine or with lime was ordered. Houses which had been covered by the water were dried and whitewashed, and the carcasses of domestic animals were buried to prevent the people from eating the contaminated flesh. Propaganda for personal hygiene was carried on by medical hygienists, and parties armed with suitable apparatus were sent round to disinfect salvaged goods and chattels.

Inoculation against typhoid and dysentery was made compulsory and administered without fee, and in one week 8500 people were vaccinated for typhoid and 45,000 for dysentery. The State Institute of Hygiene had considerably to increase its output of vaccine. A service of ambulances which patrolled the districts was organised; the number of beds in the existing hospitals was increased, and new ones were improvised to accommodate all the sick. During the last few days a mild epidemic of common gastro-enteritis of short duration has been reported, principally among children, but so far there has not been a single case of dysentery or typhoid. It seems that the battle against epidemic diseases has been won.

ROYAL EAST SUSSEX HOSPITAL.—On July 14th Lady Willingdon opened a new nurses' home at this hospital. It was originally proposed to build a home near the hospital, but the large premises and grounds of a school nearby became vacant and the premises were acquired, reconditioned, and adapted at a cost of £25,000.

CORRESPONDENCE

CORONARY THROMBOSIS AND AFTER:

A PERSONAL STORY

To the Editor of THE LANCET

SIR,—This is not a scientific communication. erhaps for this reason an apology may be considered ecessary but much more must the writer ask pardon s it is an account of a personal experience in the rst person singular.

Five years ago at the age of 54 I was engaged a busy consulting practice. My work was exacting nd irregular. Long distances had to be covered by ar and I mostly drove myself and I was overweight and was putting on weight. I was smoking heavily—cigarettes, pipes, and cigars. At the week-ends I used to take violent exercise with the idea of keeping fit. One Sunday morning in June I turned a back somersault on the lawn. The best description of what happened afterwards is that I felt "queer" and I felt it necessary to lie still for some minutes. The same afternoon I played tennis and was conscious of an occasional tightness in the chest. The same night about 1 A.M. I was awakened by a severe pain across the lower ribs and epigastrium. As I gradually became more awake I thought I was starting an attack of gall-stone colic or pancreatitis, but in a short time the pain became more localised and was substernal about the level of the third and fourth interspace. It crossed my mind that the pain was cardiac, and I diagnosed a coronary thrombosis and waited for the next thing to happen. It is difficult to describe the pain as my sensibility was numbed after a time. But it was a gradually increasing pain, and I said to myself, "This can't go on much longer." All the time it was strictly localised. My mental attitude was strange. It seemed that it was happening to someone else. After a time I became restless and got out of bed. I was filled with curiosity and went to my dressing room and looked at myself in the glass. My face and brow were covered with sweat, the general colour was grey, and my lips blue. I said to myself: "This is shock, I need morphia." But as I had none I poured out some chlorodyne. I then thought that my last patient with this condition had been sick and I prepared myself to vomit but nothing happened. I then took the chlorodyne and went back to bed. For the first time I felt my pulse and it was very slow, but increased in rate as I became warmer.

Next morning I had almost forgotten about the attack and thought it was indigestion, but a return of the pain on attempting to do my exercises, and even with the effort of dressing, made me think differently. I then started the day's work and, as far as I can trace my actions, did it in much my usual way. I had a long country journey to a consultation, and I allowed my chauffeur to drive—which was unusual. The next few days passed in the same way, though two events are to be noted. I had been intending to have a doubtful molar out, and the extraction under local anæsthesia took 45 minutes' hard work; there was an abscess around two of the apices. I was none the worse for it—in fact, I felt better soon afterwards. The other event was an unpleasant committee meeting at the hospital. I had to speak, and said what I wished, but I brought my remarks to an early finish as I had pain. On sitting down my pulse was 140.

I asked a colleague about this time to take my blood pressure, and he found the systolic pressure was 96, the normal figure being 150 or more. At times I felt certain that the condition was cardiac but I would attempt to persuade myself that it was not so. I wrote to a friend who is a cardiologist and described to him as light-heartedly as I could what had happened. He wired "Go to bed." I compromised and gave up work and lay in a long chair in the garden. It was the time of Wimbledon, and I listened to the running description of the matches, but I found that the excitement brought on pain. I therefore collected a lot of books that I wished to read, but I hardly read a page as I promptly went to sleep. After ten days I was taken by road to see a cardiologist and an electrocardiogram was taken. I examined it and saw that the T wave was inverted in Leads II and III. I then consented to go to bed and stayed there a month. The time passed very pleasantly, as the weather was beautiful and from my bedroom I could see for many miles. With field glasses I could keep myself entertained, but reading was only possible for short periods. There was only one unpleasantness during my stay in bed. I was much bothered by premature beats and irregularities. I tried to repeat my own teaching about them. "They are of no importance except in so far as they are accompaniments of definite serious disease, they call attention to themselves and are fussy." But it did not work as it should. Another tiresome irregularity was a waning of the pulse. A wave of gradually lessening pulsation would set in and go on until the pulse was imperceptible. I was conscious of it without feeling my pulse. The sense of emptiness and of being nothing at all is indescribable. I used to wave my arms about to bring back the circulation. Finally I argued that I was too sensitive to my peculiarities, and in this I was right, for a mixture of chloral and bromide improved matters. The irregularities probably occurred but were not noticed.

The next event was the removal of the family to the seaside in August. I cannot say that I enjoyed it at first, chiefly because I missed my home comforts. But one afternoon I was alone on the beach with my younger child and she said, being in her bathing dress, "Daddy, do bathe, and then I can." The sea was inviting and the day warm, and the surf looked exhilarating. I went in under a breaker wondering what would come up. The change was miraculous. I came out feeling fit and strong and ready to run up the beach. After that a daily bathe improved my general and cardiac condition enormously. In September a second electrocardiogram was done, and the T wave in Lead II was the right way up. In Lead III it was inverted but I did not mind that.

After that I went back to work, cutting it down as much as possible. But it is only possible for a doctor to give up hospital work or similar work. If one refuses private work there is shortly none to refuse. For a year there was a constant endeavour to do as little as possible, but as private work went on increasing the only ways out of the difficulty were either to retire or start afresh elsewhere. The former meant being a bored invalid on a reduced income and therefore was not seriously considered, so 18 months after my cardiac accident I migrated. In my new surroundings I did nothing for three months, and enjoyed myself in simple pleasures such as sight-seeing and in doing things that are impossible in a busy professional life. Then becoming restive I took a consulting room and gradually collected practice once more. I now do all the work that comes my way, and I live an ordinary life, being now in my sixtieth year. I play a little tennis of the family kind, I punt at my own pace, I swim, occasionally I dance. Each winter I go to the Alps for winter sports, and can climb on skis as well as run down, though I must confess that each winter finds me more of a rabbit.

Of course, I have cardiac sternal pain on occasions, but I have learnt to avoid it to a great extent. It is not so much the product of effort as of mental disturbance and/or a full stomach. The conditions in which the sternal pain is likely to come on become recognised and thereby avoided. An ordinary breakfast for me is a mistake if I have to work soon afterwards. Fruit, toast, and marmalade are almost a guarantee of a comfortable morning. About 11 o'clock I can do anything. I can walk quickly and in comfort, and I can tackle anybody about anything. Lunch is a light one, and is not upsetting. Tea is given a miss and dinner is variable. At home I have a short and almost teetotal meal, but I have no fads if I am dining out or have friends to dinner.

Tablets of nitroglycerin, gr. 1/100, are a great help. If taken before exercise pain does not come on or is lessened. If the pain is on, a tablet slowly sucked will drive it away. Further the knowledge that there is a supply in my pocket helps to keep pain at a distance. How nitroglycerin acts may be known to pharmacologists. In my case the first event is a good belch, followed by relief of some of the pain, possibly attributable to relaxation of spasm of the cardiac sphincter. It is curious that I have a great desire to suck lozenges. Anything will do, but I prefer a mild eucalyptus lozenge of a popular make. It is certain that with me one attack of pain in the early part of the day makes it easier for other attacks to follow. Nitroglycerin is invaluable in preventing these unpleasant happenings. Also bromides are useful, especially when some tantalising exhausting patient or telephone operator has been a nuisance. After an attack of pain ten minutes sleep in a chair is the best preventive of another.

Effort by itself can bring on pain and it is very selective. For example, digging is easier than shovelling. Walking with someone whom I do not know well, and to whom I do not wish to explain my peculiarities, is more trying than walking alone. The fear of pain coming on is likely to bring it on. Struggling to my seat when late for a theatre is sure to bring it on. I have learnt to miss trains without trying to catch them. I only board stationary buses, and I take a taxi and do not walk anywhere if I am late. Being fussed is a more potent cause of pain than effort, and when fussed effort is impossible. The following incident is a good illustration. Being a casual backer of horses, one day I backed two by telephone and doubled them. At my club, to my surprise, I found that both had won and at long odds. I suddenly wondered if the telephone message had been correctly received, and started to walk the half mile, some of it uphill, to the bookmaker's office. I had to stop four times on the way and on arrival could not manage the stairs to the first floor office. However, when I opened his door his first words were: "Well, doctor, that was a very pretty double you had to-day." I walked home at four miles an hour and without pain. This trivial incident shows very conclusively how much bunkum there can be in effort pain—at any rate in my case. But bunkum or not, the pain is real and insists on being respected. The lesson to be learned is the importance of a calm and tranquil attitude of mind, which is of even greater importance than a comfortable stomach.

Sunshine and all that it brings make pain disappear. In Switzerland for winter sports I can ski and skate quite comfortably. My performances are not what they were but I do not need to avoid expeditions on account of my condition. The only time when I had a tiresome pain was when a party of us were doing an expedition on a dull day and had to be at a certain point at a certain time in order to get a lift back. This entailed going against the clock and I had to stop. I have not done any shooting in the last few years as keeping line and being at a particular stand at the right time might be awkward. But I have waded in a salmon river and used a 16-foot rod. Driving a car is easy, but when tucked away deep in a car park the heavy work of turning the wheel to and fro is likely to bring on pain. When pain brings me to a standstill it goes on and becomes more severe for 10 or 15 seconds and then gradually goes off. It would seem that slowing of the heart at first increases the pain. With nitroglycerin, however, this symptom is not noticeable.

If there is any value to any sufferers from minor degrees of cardiac pain in what I have written it will be very gratifying to me. My advice to any who have similar symptoms is as follows: do not be upset by it; do not test yourself to see what you can do; take everything calmly and in your stride and if the pain catches you rest and suck a nitroglycerin. Regulate your life as regards meals and movements after meals. Do not be strict about diet but be sensible; do not become a valetudinarian; keep your weight down and do not smoke much—better do not smoke at all. Follow your inclinations and you will learn how much is easy for you; adopt the philosophy of the "lower level of activity" and you will find with surprise how little there is that you cannot do; remember the three things to consider in the order of importance are mind, stomach, heart.

Lastly, it is of interest that the managing director of a well-known insurance company said to me recently: "We find we can safely take the load of such heart cases as yours, as their lives are as long or longer than those of so-called normal individuals, because these heart patients have learnt to regulate their lives."—I am, Sir, yours faithfully,

July 30th. LEARN AND LIVE.

GOLD SALTS IN ASTHMA

To the Editor of THE LANCET

SIR,—Some time ago, without knowledge of any previous attempts of the same kind, we started treating cases of bronchial asthma with Sanocrysin in small doses. We were surprised to find that in every case the asthmatic attacks ceased after the first, and sometimes after the second, injection. The bronchitis also improved; so much so, that all adventitious sounds disappeared and wheezing and tightness of the chest between the attacks were banished.

Our cases may be divided into two categories, according to whether they were treated in my section at Kasr-El-Ainy Hospital or in my private practice. During the last ten months I have treated in my private clinic 55 cases of asthma, of duration varying from a few months to 14 years. All but three of these cases ceased suffering, and even these showed slight improvement. Five of the cases were purely allergic and showed no chest signs between the attacks. The rest were all bronchial. About 20 were of the seasonal type, which made me choose to treat them during the period of illness; the rest had attacks all the year round.

At the hospital there have been 46 cases in all, f which did not come back after the first injection l could not be traced. A first series of 18 cases (11 them continuous, 4 seasonal) were treated as patients, with the result that 15 were cured and other 3 improved. The second series of 28 cases re treated as out-patients. Three of these, as eady stated, did not come back after the first jection; 10 cases of seasonal asthma were all red; 15 cases of continuous asthma showed 3 lures and 12 cures. In all the above cases tuberlosis was excluded by radiography of the lungs and peated sputum examinations.

The sanocrysin is given by intravenous injection ice a week, beginning with a small dose of 0·05 g. d gradually increasing it by 0·05 g. each time. sually not more than five injections are given. nprovement appears after the second injection; the bronchitis disappears at the end in most of the cases.

Certain precautions, however, should be taken in adopting this method of treatment. First, the kidneys and liver must be sound. Examination of urine before every injection is imperative, for even if the kidneys are healthy at the beginning the gold compound is capable of producing acute nephritis; though, happily, with the small doses we have used we have had no cases developing this very unwelcome complication. Sometimes fever appears from 6 to 24 hours after the injection; but it is of short duration, not exceeding two or three hours, and the temperature never rises beyond 38° C. (100·4° F.). A very few cases have developed dermatitis, but it was so slight it was not even remarked by the patient. After the first injection the bronchitis was usually accentuated. Three patients developed slight albuminuria, but this ceased in a few days and treatment was resumed. I found that by putting the patient on a salt-free diet for three days, including the day of the injection, all these complications were obviated.

In conclusion, I may say that I have gone through all the available international literature on the therapeutics of asthma and have not found that anyone has treated the uncomplicated non-tuberculous disease with our method. In 1932 Dr. A. Dudan reported on 20 cases of tuberculous asthma treated with gold injection of which 17 cases were cured and 3 improved (Schweiz. med. Woch., 1932, lxii., 96).

I am, Sir, yours faithfully,

G. P. G. SOBHY.

Cairo, Egypt, July 16th.

THE CAUSE AND PREVENTION OF MALIGNANT GROWTHS

To the Editor of THE LANCET

SIR,—Our knowledge of the ætiology of cancer is steadily advancing through the long efforts of earnest workers, and prophylactic measures are now being suggested, though some still hold that preventive ideals are as yet only dreams of no scientific value. All, however, recognise the important part played by long, grave irritation, while to me cytology seems to point to a poisoning germ being present and converting into actual cancer a tumour or other local disease previously non-malignant. This is a clinical view. Long experience has led me to the opinion that "cancer is a putrescence, which, having entered into an animal by being swallowed or inhaled, or more rarely having been formed within the patient, finds a weak place in the body, where the blood is unable to cope with it, and, modified by its organic involvement, continues its putrefying career, meeting with resistance, which it finally overcomes, the victim failing through slow putrescent poison." In many cases, however, cures are effected through promptness in diagnosis and wise choice of early treatment.

I had not been long engaged in practice—say 50 years ago—before I was forced to the conclusion that the truth about cancer was not what I had been taught. Our instructors used to teach us that tumours were innocent or malignant, and that they did not change from the former to the latter. Having doubts about this view, I was glad to note that others were forming similar opinions; and soon the name *pre-cancer* began to be given to a weak spot susceptible to infection—a wart, adenoma or other growth, hitherto benign, or a fissure, ulcer, or any site of chronic inflammation. It early suggested itself to me that, as the tendency of cancers was to ulcerate with offensive discharges, the infection in pre-cancer was itself a product of putrescence. If so, what is the other contributing element, locating the position and bringing about the beginning of a cancer? What is the genesis of the first malignant cell? The answer seems to be a previously non-malignant cell becoming unable to resist the putrescent poison, because the blood of the immediately local circulation has lost its power to adequately oxidise and by phagocytosis destroy the invader. The putrescence, having got into the patient, ramifies through the body, and, though beaten off by the vitality of the individual everywhere except in the pre-cancerous place, poisons the latter which is too weak to resist it, and thus is accomplished the beginning of malignancy.

Whether or not the germs of cancer are specific has yet to be proved; but I submit it is possible that one, or more than one, of the vicious germs, already known to us, may so poison a cell in a weak place as to forthwith make it malignant. The point is that lack of power to resist the entering toxin enables the infecting germ to start the change, thus altering the pre-cancer into a malignant growth. If the entering poisonous germ has in itself malignant properties they are not destroyed in the pre-cancer, as they are by the blood, wherever the tissues are healthy, and the same equally applies if the first malignant cell is an embryological freak created by the union of the infecting putrescent germ with one of the cells of the pre-cancer. There appears to me to be nothing unlikely in a putrescent invader causing gastro-enteritis in one person and possibly no complaint at all in another, yet in a third case so poisoning a pre-cancer as to change into a malignant cell one that had been hitherto innocent.

Nature physiologically provides the inhibition of cell growth beyond what is required for the maintenance of health or repair of wounds and injuries, but in a limited area, where this natural power of inhibition is pathologically lost, a cyst or other tumour may grow, often started by a very slight cause. This cell proliferation is primarily quite a separate thing from cancer. Pressure and lack of maintained nutrition may cause in certain tumours necrotic changes which, though fatal in their own way, are neither sarcoma nor carcinoma. The excessive activity of oxygen in the blood of young persons, even in inflammatory and weakened parts, is probably the explanation of their generally escaping malignant diseases.

Some authorities teach that heredity plays an important part in cancer. Striking instances have been recorded in occasional family histories, and further clinical investigation of this aspect of malignancy is much needed. It may be that in good health powers of capacity to fight enemy germs are normally passed down from parents to children, and that in lack of adequate health the absence of these desirable transmissions is the reason why diseases are, or so often appear to be, hereditary.

Some contend, while others are sceptical, that cancer is infectious. In the case of endangered persons, not immune by adequate youth or freedom from pre-malignancy, I consider that emanations from ulcerating cancers *are* infectious.

Carcinoma is often thought to be an increasing disease, but I do not agree with this view. These growths were rampant 50 years ago, and their great prevalence specially interested me in their nature. Statistics used not to be prepared with the care and accuracy that they now are. When consulted by patients suffering from certain forms of cancer, my experience has been the usual one—I have almost invariably found long neglected local growths, or the patients have been the victims of chronic irritations or slow inflammations which had never received serious treatment. They had also been accustomed to eat too much animal food or their daily consumption of alcoholic drinks had been beyond the limits of ordinary prudence. I have, however, long watched the advancing years of patients following rules of health which I had given them. Those still living are quite free from cancer, while the others, who have passed away, never suffered from malignant growths but died of other complaints or of old age. As soon as a pre-malignant place is suspected, the help of the radiologist and surgeon should be sought. When the truth about cancer comes fully to light, I feel that it will be the outcome of team-work, clinicians making their contribution alongside of the efforts of radiators, surgeons, and laboratory workers.

In conclusion, I am fully conscious that, whether we consider malignancy from the point of view of causation or prevention, it still presents a theme so baffling that none dare venture to dogmatise about it. Only in a spirit of disciplined humility, with slow and halting steps, can we submit opinions to our fellow practitioners for their consideration.

I am, Sir, yours faithfully,

Liverpool, August 1st. GLYNN WHITTLE.

MEDICINE AND DENTISTRY

To the Editor of THE LANCET

SIR,—It has been reported that there are too many newly qualified medical men. It has also been reported that there have been too few students entering the dental schools to ensure an adequate supply of dental practitioners for the near future. Therefore would it not be a good plan for some of the newly qualified medicals to join forces with established L.D.S.'s, and assist and learn from them with a view to practising permanently as dental surgeons, a designation to which they are entitled? These post-graduate students—for that is wha y would be—could carry on some medical prac start a medical practi e same time, and of it later to a nei other if their practice necessitated lieve this wh would benefit bot al and the professions and the

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EARSON, I

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BUYING CENTRES

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SIR,—In terms of Mrs. Beaton the chief ingred of a "buying centre" is buyers, and plenty of th A pudding sparsely compounded of the ingredie from which its name is derived may just as wel called by any other name and at the best is li to be insipid. The idea of a buying centre is good: place where, under one roof, a person who wants buy a chair, for instance, could see, and sit down every kind of pew constructed by every chair-mak would be an ideal rendezvous for chair buyers. could you get chair buyers to come? Who is prevent one or two of them from sneaking round th corner to the nearest furniture shop and "doin deal" there and then, buying centre or no buyi centre? A week or two back a popular noblem opened a buying centre for hospital equipment and su plies which has been established at British Industr House, which is near the Marble Arch. The ceremo was attended by a large and distinguished compan indeed we are informed that more than two thous persons were present and this is not to be wonde at, since the invitation list was big and good and and cakes were served, presumably ad libitum. It was wise advice which Thomas Carlyle gave, that one should not judge of a building while the scaffolding i up, and, having this in mind, we decided to pay second visit; so a few days after we went ag Shades of Hans Breitmann! "Vhere ish dat ha now?" The caravan had passed on and save fo well-informed and very courteous guide we had ten thousand square feet hospital ward with modern beds, modern ventilation, modern locke modern lighting system and all its modern wonde fulness literally to ourselves. One recalled the st ness of the mortuary. The silence of the operati theatre was broken only by the questions and answ of the same two persons and the like can be said the clinical laboratories, the surgeons' rooms and the whole magnificent suite.

Well, one might say, it is too soon to expect throng of buyers; it is too soon to hear the babel the 23 languages which the interpreters can spe So stepping into the most magnificent lift we ha ever seen, walled with plate glass covering pleasing tapestry, so it seemed, we were taken to a higher storey, to the exhibits of medical supplies which hav been in situ for quite a little time. Still ourselv and our urbane guide wearing his old school tie, ve proper, were in sole possession. Then we went to th club rooms and sat in the buyers' chairs: wonder chairs reminding us of Egypt and Tottenham Cour road at the same time. But where were the buyers

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INDUSTRIAL DERMATITIS

To the Editor of The Lancet

Sir,—I feel sure you will allow me a little space o draw attention to what seem like two important missions from the article on Industrial Dermatitis by Dr. Sibyl Horner in your last issue, the more so s she writes in her official capacity in the Home Office. It will have been noticed that she makes no reference whatever to the fact that in many, f not most, of the industries associated with the production of industrial dermatitis the workers are exposed to small quantities of carbon monoxide gas in the atmosphere which they inhale. Small quantities of carbon monoxide gas inhaled over a prolonged period have a debilitating effect of an accumulated nature on the blood, and the tissues exposed to irritation being lowered in vitality as a consequence fail to recuperate after each exposure.

A person exposed to a combination of carbon monoxide gas and some other poison such as lead fumes becomes a ready victim to lead poisoning, and, as Dr. Horner knows, I have been able to show that by reducing the amount of carbon monoxide gas to which workers in spelter works are exposed it has been possible to eliminate lead poisoning from a large and important factory (Med. Press and Circ., Nov. 23rd, 1932). Dr. Horner makes no mention of the different responses made to these trade irritants by workers in the several health categories from A1 to C3 to which I have already drawn attention (Brit. Med. Jour., June 2nd, 1934, p. 1008). The C3 type falls a victim more readily than one belonging to the A1 category, and this surely is a point of very great importance in more ways than one.

The presence of CO gas is important because some of these cases of dermatitis are but the prelude to industrial cancer, which I have shown occurs only amongst workers who have been exposed to the inhalation of CO gas over prolonged periods of time (Med. Press and Circ., August 30th and Sept. 20th, 1933). I am, Sir, yours faithfully,

Swansea, August 7th. G. Arbour Stephens.

MEDICINE AND THE LAW

Claims by Infants

During the judicial sittings which ended last week an unusual point was taken on a claim for alleged negligence in respect of treatment in a L.C.C. hospital. In October, 1932, a number of infants entered the hospital. Through their parents they complained that at the hospital they contracted a disease during that month by reason, it was stated, of the negligence, unskilfulness, and breach of duty of the medical superintendent. On Jan. 31st, 1934, they took out a writ claiming damages from the L.C.C. as the responsible authority and from the medical superintendent personally. The lapse of time before the writ was issued is important. The Public Authorities' Protection Act of 1893 sets a six-months' time-limit on the bringing of actions against a public authority for any alleged negligence in the execution of a public duty or of an Act of Parliament. The L.C.C. is undoubtedly a public authority within this protection and has often defended itself by pleading the statute. The plaintiffs on this occasion sought to get round the statute by arguing that it did not apply to infants. They referred to the old Statute of Limitations (of 1623) which expressly reserves the rights of infants until they come of age. Thus a preliminary question of law was brought before Mr. Justice Roche for decision—was the Public Authorities' Protection Act of 1893 no protection against a claim by a person under age? The judge held that the infants' claim was barred; the 1893 Act made no exception in favour of infants and the 1623 Act was a different affair altogether. He did not, however, dismiss the action outright; he merely struck out the statement of claim and thus left the plaintiffs free to begin again. They can now raise any matter which has happened within six months of the writ. If, therefore, they are still uncured of the effects of the disease and have consequently suffered damage within the six-months period, they can shape their claim afresh accordingly. The L.C.C. will presumably rely upon the usual defence that it did not itself render the alleged unskilful treatment and that its duty to the plaintiffs was finished when it appointed a suitable medical officer.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

The following appointments are notified:—

Surg. Capts. J. P. Shorten to *Drake*, for Plymouth Hosp.; G. F. Syms to *Victory*, for Haslar Hosp.; and H. M. Whelan to *Pembroke*, for Chatham Hosp.

Surg. Comdrs. G. Kirker to *Drake*, for R.N.B.; W. A. Jolliffe to *Cairo*; T. N. D'Arcy to *Rodney*; L. W. Gemmell to *Pembroke*, for Chatham Hosp.; M. S. Moore to *Renown*; L. S. Goss to *Drake*, for R.N.B.; and M. B. Devane to *Victory*, for R.N.B., and to *Resource* on recommg.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. T. C. Larkworthy to be Surg. Lt.-Comdr.

Proby. Surg. Lt. (D) A. B. Bateman to be Surg. Lt. (D).

The following appointments are notified:—

Surg. Lt.-Comdrs. W. H. Butcher to *Vernon*; D. C. Wilson to *Victory*, for Haslar Hosp.; and S. B. Borthwick to *Victory*, for R.N.B.

ROYAL ARMY MEDICAL CORPS

Capt. A. E. Campbell to be Maj.

Lt. (on prob.) D. M. Ahern is restd. to the estabt.

ARMY DENTAL CORPS

Capt. A. H. Kay to be Maj. (prov.).

TERRITORIAL ARMY

Lt.-Col. D. S. Sutherland to be Bt. Col. and retires on completion of tenure of comd. and *retains his rank*, with permission to wear the prescribed uniform.

Maj. J. F. O'Grady to be Lt.-Col., and to comd. the 12th (2nd Western) Gen. Hosp.

Capts. W. Lumley and J. Cohen to be Majs.

INDIAN MEDICAL SERVICE

Col. G. D. Franklin retires.

Col. C. W. F. Melville, K.H.P., to be Maj.-Gen.

Capt. C. V. D. Rose to be Maj.

Capts. (on prob.) to be Majs. (on prob.): P. V. Karamchandani and R. K. Misra.

Lt. (on prob.) V. M. Albuquerque to be Capt. (on prob.).

Temp. Lt. Ilahi Bakhsh to be Temp. Capt.

The promotion of the undermentioned officers as Capts. is confirmed: B. D. Khurana, E. H. Lossing, R. J. Jarvie, M. Sendak, and G. W. Miller.

Ilahi Bakhsh to be Capt. (on prob.).

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SIR,—It has been reported that there are too many newly qualified medical men. It has also been reported that there have been too few students entering the dental schools to ensure an adequate supply of dental practitioners for the near future. Therefore would it not be a good plan for some of the newly qualified medicals to join forces with established L.D.S.'s, and assist and learn from them with a view to practising permanently as dental surgeons, a designation to which they are entitled? These post-graduate students—for that is what they would be—could carry on some medical practice or start a medical practice at the same time, and dispose of it later to a neighbour or other if their dental practice necessitated this. I believe this whole plan would benefit both the dental and the medical professions and the public.

I am, Sir, yours faithfully,

R. MEYNELL PEARSON, L.D.S.

Gillingham, Kent, August 1st.

BUYING CENTRES

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SIR,—In terms of Mrs. Beaton the chief ingre of a "buying centre" is buyers, and plenty of t A pudding sparsely compounded of the ingredi from which its name is derived may just as we called by any other name and at the best is l to be insipid. The idea of a buying centre is good place where, under one roof, a person who wants buy a chair, for instance, could see, and sit down every kind of pew constructed by every chair-mak would be an ideal rendezvous for chair buyers. could you get chair buyers to come? Who is prevent one or two of them from sneaking round t corner to the nearest furniture shop and "doin deal" there and then, buying centre or no buy centre? A week or two back a popular noblem opened a buying centre for hospital equipment and s plies which has been established at British Industr House, which is near the Marble Arch. The cerem was attended by a large and distinguished comp indeed we are informed that more than two thous persons were present and this is not to be wonde at, since the invitation list was big and good and and cakes were served, presumably ad libitum. It was wise advice which Thomas Carlyle gave, that one should not judge of a building while the scaffolding up, and, having this in mind, we decided to pa second visit; so a few days after we went ag Shades of Hans Breitmann! "Vhere ish dat b now?" The caravan had passed on and save f well-informed and very courteous guide we ha ten thousand square feet hospital ward with modern beds, modern ventilation, modern lock modern lighting system and all its modern won fulness literally to ourselves. One recalled the s ness of the mortuary. The silence of the operat theatre was broken only by the questions and answ of the same two persons and the like can be sai the clinical laboratories, the surgeons' rooms and the whole magnificent suite.

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D. L.

INDUSTRIAL DERMATITIS

To the Editor of THE LANCET

IR,—I feel sure you will allow me a little space draw attention to what seem like two important issions from the article on Industrial Dermatitis Dr. Sibyl Horner in your last issue, the more so she writes in her official capacity in the Home ice. It will have been noticed that she makes reference whatever to the fact that in many, not most, of the industries associated with the oduction of industrial dermatitis the workers are posed to small quantities of carbon monoxide s in the atmosphere which they inhale. Small antities of carbon monoxide gas inhaled over a olonged period have a debilitating effect of an cumulated nature on the blood, and the tissues posed to irritation being lowered in vitality as a nsequence fail to recuperate after each exposure.

A person exposed to a combination of carbon onoxide gas and some other poison such as lead mes becomes a ready victim to lead poisoning, and, Dr. Horner knows, I have been able to show that reducing the amount of carbon monoxide gas which workers in spelter works are exposed it as been possible to eliminate lead poisoning from large and important factory (Med. Press and irc., Nov. 23rd, 1932). Dr. Horner makes no mention the different responses made to these trade irritants workers in the several health categories from A1 C3 to which I have already drawn attention Brit. Med. Jour., June 2nd, 1934, p. 1008). The C3 ype falls a victim more readily than one belonging to he A1 category, and this surely is a point of very reat importance in more ways than one.

The presence of CO gas is important because ome of these cases of dermatitis are but the prelude o industrial cancer, which I have shown occurs only mongst workers who have been exposed to the nhalation of CO gas over prolonged periods of time Med. Press and Circ., August 30th and Sept. 20th, 1933). I am, Sir, yours faithfully,

Swansea, August 7th. G. ARBOUR STEPHENS.

MEDICINE AND THE LAW

Claims by Infants

DURING the judicial sittings which ended last week an unusual point was taken on a claim for alleged negligence in respect of treatment in a L.C.C. hospital. In October, 1932, a number of infants entered the hospital. Through their parents they complained that at the hospital they contracted a disease during that month by reason, it was stated, of the negligence, unskilfulness, and breach of duty of the medical superintendent. On Jan. 31st, 1934, they took out a writ claiming damages from the L.C.C. as the responsible authority and from the medical superintendent personally. The lapse of time before the writ was issued is important. The Public Authorities' Protection Act of 1893 sets a six-months' time-limit on the bringing of actions against a public authority for any alleged negligence in the execution of a public duty or of an Act of Parliament. The L.C.C. is undoubtedly a public authority within this protection and has often defended itself by pleading the statute. The plaintiffs on this occasion sought to get round the statute by arguing that it did not apply to infants. They referred to the old Statute of Limitations (of 1623) which expressly reserves the rights of infants until they come of age. Thus a preliminary question of law was brought before Mr. Justice Roche for decision—was the Public Authorities' Protection Act of 1893 no protection against a claim by a person under age? The judge held that the infants' claim was barred; the 1893 Act made no exception in favour of infants and the 1623 Act was a different affair altogether. He did not, however, dismiss the action outright; he merely struck out the statement of claim and thus left the plaintiffs free to begin again. They can now raise any matter which has happened within six months of the writ. If, therefore, they are still uncured of the effects of the disease and have consequently suffered damage within the six-months period, they can shape their claim afresh accordingly. The L.C.C. will presumably rely upon the usual defence that it did not itself render the alleged unskilful treatment and that its duty to the plaintiffs was finished when it appointed a suitable medical officer.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following appointments are notified:—

Surg. Capts. J. P. Shorten to *Drake*, for Plymouth Hosp.; G. F. Syms to *Victory*, for Haslar Hosp.; and H. M. Whelan to *Pembroke*, for Chatham Hosp.

Surg. Comdrs. G. Kirker to *Drake*, for R.N.B.; W. A. Jolliffe to *Cairo*; T. N. D'Arcy to *Rodney*; L. W. Gemmell to *Pembroke*, for Chatham Hosp.; M. S. Moore to *Renown*; L. S. Goss to *Drake*, for R.N.B.; and M. B. Devane to *Victory*, for R.N.B., and to *Resource* on recommg.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. T. C. Larkworthy to be Surg. Lt.-Comdr.

Proby. Surg. Lt. (D) A. B. Bateman to be Surg. Lt. (D).

The following appointments are notified:—

Surg. Lt.-Comdrs. W. H. Butcher to *Vernon*; D. C. Wilson to *Victory*, for Haslar Hosp.; and S. B. Borthwick to *Victory*, for R.N.B.

ROYAL ARMY MEDICAL CORPS

Capt. A. E. Campbell to be Maj.

Lt. (on prob.) D. M. Ahern is restd. to the estabt.

ARMY DENTAL CORPS

Capt. A. H. Kay to be Maj. (prov.).

TERRITORIAL ARMY

Lt.-Col. D. S. Sutherland to be Bt. Col. and retires on completion of tenure of comd. and retains his rank, with permission to wear the prescribed uniform.

Maj. J. F. O'Grady to be Lt.-Col., and to comd. the 12th (2nd Western) Gen. Hosp.

Capts. W. Lumley and J. Cohen to be Majs.

INDIAN MEDICAL SERVICE

Col. G. D. Franklin retires.

Col. C. W. F. Melville, K.H.P., to be Maj.-Gen.

Capt. C. V. D. Rose to be Maj.

Capts. (on prob.) to be Majs. (on prob.): P. V. Karamchandani and R. K. Misra.

Lt. (on prob.) V. M. Albuquerque to be Capt. (on prob.).

Temp. Lt. Ilahi Bakhsh to be Temp. Capt.

The promotion of the undermentioned officers as Capts. is confirmed: B. D. Khurana, E. H. Lossing, R. J. Jarvie, M. Sendak, and G. W. Miller.

Ilahi Bakhsh to be Capt. (on prob.).

industrial disease or the conditions in the factories. Some pressure should, he thought, be brought by the Government on the General Medical Council to secure that the tendency of medical education should be more in this direction.

He felt that Mr. Rhys Davies had laid more stress on the deficient success that had resulted from the work of the factory surgeons, the medical officers, and the whole factory system in regard to the prevention of industrial disease. If risks were to be reduced to a minimum before any new process or industry was allowed to arise it would not be possible to get the fresh employment that was required. They must face risks. A large number of new industries and processes were being discovered as a result of research in industry and fresh industrial diseases would constantly arise which required vigilance on the three sides of industry.

UNDER-SECRETARY'S REPLY

Captain CROOKSHANK said that as soon as new symptoms of industrial disease were discovered all the skill that could be found was brought to bear to try and find remedies. At the end of it one was still left with the fact which struck one on practically every page of this report and that was the almost incredible number of avoidable accidents. He assured Mr. Davies that the strength of the inspectors' department was to be reviewed before the next estimates were presented. As to a medical inquiry into the more-looms-per-weaver system they had not yet sufficient medical data for scientific investigation. The Home Office had taken up the question of dust trouble in malt houses with a view to preventing the inhalation of dust. He did not think they could make the deduction that there was a tendency for skin cancer to increase. Because the figures went up it did not necessarily mean that there were more cases. It probably meant that cases were notified more quickly and earlier. The increase in the number of cases of anthrax from 2 to 10 had nothing to do with the Liverpool disinfecting station; they arose entirely from hides and skins. The Home Secretary had now completed his review of the proposals submitted to him for the amendment of the silicosis compensation scheme. Last week he sent to the Mining Association and the Miners' Federation of Great Britain a memorandum indicating his conclusions. Limitation to particular underground processes gave rise to serious difficulties and he proposed to expand the scheme so as to include underground employment generally in coal-mines. As regarded the increase in industrial accidents it must be the case that as employment increased, unless more attention was paid to safety devices there would be more accidents. By the law of averages before Parliament met again there would have been something approaching 30,000 accidents in industry and 150 people would have lost their lives. That fact put considerable responsibility on everyone concerned. These matters were largely matters of education. If only more would come to the Home Office Industrial Museum and see the kind of safety devices which up-to-date factories could employ to avoid accidents he thought they might get an improvement.

MEDICAL NEWS

English Conjoint Board

At the recent final examination of the Board the following candidates were approved in the subjects indicated, but are not yet eligible for the diplomas of the colleges :—

Pathology.—B. Agranat, Guy's; H. F. Anderson, Camb. and St. George's; T. G. Armstrong and R. A. J. Asher, Lond.; Minnie Atkin, King's Coll.; E. C. Atkinson and D. S. D. Barber, St. Bart.'s; A. J. E. Barlow, Leeds; A. H. Barwell, St. Georges; P. W. G. Baxter, Guy's; W. M. Beattie, Camb. and Liverp.; R. D. I. Beggs, Camb. and Middx.; A. L. W. Bell, Guy's; G. Blackburn, Camb., and St. Bart.'s; D. M. Blomfield and G. L. Bohn, St. Bart.'s; A. P. Booth, Lond.; B. B. Botha, St. Bart.'s; P. I. Boyd and Margaret Brodigan, Univ. Coll.; H. S. Brodribb, Oxon. and St. Bart.'s; E. A. Brown, St. Mary's; K. P. Brown, L. H. Buckland, and A. Z. Butt, St. Bart's; H. B. C. Carter-Locke, St. Thos.; T. D. Chablani, St. George's; J. Charnley, Manch.; L. J. Clapham, St. Mary's; J. V. Clark, Guy's; W. E. Clarke, Charing Cross; P. E. G. Clements, St. Bart.'s; G. H. Collier, Manch.; W. T. Cooke, Camb. and Birm.; M. Cohen, King's Coll.; E. C. Cordeaux, Middx.; J. O. Creighton, St. Thos.; T. Csato, Middx.; J. V. Dacie, King's Coll.; D. A. Davies, Guy's; Hilda S. F. de Peyer, King's Coll.; W. H. H. J. de Wytt, Dublin; J. F. Dow, Camb. and Middx.; A. J. Dubinsky, St. Mary's; J. E. Elliott, Guy's; G. D. Elphick, Camb. and St. George's; E. H. Evans, St. Bart.'s; E. W. R. Fairley, St. Thos.; T. S. R. Fisher, Camb. and Birm.; R. J. Force-Jones, St. Bart.'s; O. P. Frank, St. George's; C. M. Fysh, St. Thos.; L. R. Gardner, Camb. and Middx.; R. C. Garman, Oxon. and Birm.; C. E. Garson, Madras and W. Lond.; J. Geller, Westminster; V. R. Ginde, Lond.; Muriel C. Goodchild, Roy. Free; J. L. Gordon, Middx.; S. A. Greenwood-Penny, St. George's; C. U. Gregson, Camb. and Liverp.; K. L. Grogono, Lond.; D. R. Hanbury, Middx.; J. R. G. Harris, Camb. and Lond.; R. V. Havard, Univ. Coll.; G. W. Hayward, St. Bart.'s; T. C. Henry, Middx.; R. C. Hill, Guy's; W. A. T. Hill, Liverp.; K. F. W. Hinson, St. Mary's; E. D. Hoare, Camb. and St. Mary's; P. W. Houghton, St. Bart.'s; Ruth Hill, King's Coll.; A. T. Hunt, Univ. Coll.; M. Hynes, Middx.; W. L. Isaac, St. Mary's; R. P. Jarrett, Camb. and St. George's; G. O. Jelly, Oxon. and Guy's; J. D. Jenkins, Middx.; I. ap D. Jones, Cardiff; S. A. Jones, St. Bart.'s; A. E. Jowett, Bristol; R. Kauntze, Camb. and St. George's; A. H. A. Kol and A. Lasnick, Univ. Coll.; D. C. Lavender, Camb. and Middx.; J. H. Lawrence, Univ. Coll.; B. Lee, Manch.; F. H. Lee and H. A. Leggett, Guy's; H. T. Levi, Leeds; D. Levine, Cape and St. Bart.'s; H. Levitt, Charing Cross; C. A. Lillicrap, Guy's; W. L. Lister, St. Mary's; G. M. Lloyd, R. Lyons, and J. C. McAvoy, St. Bart.'s; S. M. Mankodi, Camb. and Univ. Coll.; W. N. Mann, Guy's; M. S. Marks, Glasg.; M. Marmelstein, Dublin; J. I. C. Mason, St. Bart.'s; J. H. Mayer, Guy's; H. S. Mellows, King's Coll.; L. Merrill, Guy's; B. M. Merriman, St. Bart.'s; R. A. Morta, Lond.; Elizabeth C. Morris, Roy. Free; D. F. E. Nash, St. Bart.'s; E. Nasked, Cairo and Edin.; J. G. Nel, St. Bart.'s; A. R. H. Oakley, Middx.; K. J. O'Connor Manch.; W. V. Owen, Camb. and Westminster; Maude A. Parfitt, Univ. Coll.; W. S. Parker, Manch.; A. Pearlman, Middx.; F. R. Pepper, Oxon. and St. Thos.; J. B. Phillips, Cardiff; R. M. G. Pole, St. Bart.'s; O. D. Popat, Lond.; F. O. Potter, Guy's; M. R. Preston, Middx.; D. A. Prothero, St. Bart.'s; P. Ramchander, Manch.; G. R. Rawlings, St. Thos.; B. Reeve, Lond.; J. Revans, Middx.; B. Robbins, King's Coll.; Hilda Roberts, Liverp.; H. D. H. Robinson and C. G. Roworth, Univ. Coll.; L. M. Rubein, Lond.; J. P. Salkield, Univ. Coll.; H. V. Sansom, St. Bart.'s; C. W. A. Searle, King's Coll.; A. Shapiro, Univ. Coll.; N. S. Shtetinin, Manch.; A. H. M. Siddons, Camb. and St. George's; G. G. Smith, St. Thos.; D. P. Stevenson, Guy's; L. D. Stone, Manch.; G. R. Taylor, St. Bart.'s; F. Taylor, Guy's; H. C. Thomas, Lond.; J. W. Todd, Middx.; R. C. H. Tripp, Camb. and St. Thos.; H. J. Wade, Manch.; A. R. M. Waffarn, Ceylon and King's Coll.; W. T. Wales, Cardiff; H. A. Wallace, Camb. and Univ. Coll.; R. L. Walmsley, Camb. and Leeds; G. W. Ward, Manch.; A. G. Waters, Cardiff; Catherine M. Whitestone, Univ. Coll.; N. Whittaker, Camb. and Univ. Coll.; E. D. H. Williams, Guy's; S. L. Williams, Cardiff; T. M. Williams, Oxon. and St. Thos.; I. N. Winer, Middx.; P. M. Wright, St. Bart.'s; R. F. Wyatt, St. Thos.; A. R. Yates, Lond.; Winifred F. Young, Camb. and King's Coll.

Medicine.—E. M. Abelson, Leeds; C. Anderson, St. Bart.'s; R. A. J. Asher, Lond.; D. Bhatia, Punjab and W. Lond.; Svarna L. Bhatia, Camb. and Roy. Free; P. D. Bhatt, Lond.; G. Blackburn, Camb. and St. Bart.'s; D. M. Blomfield and B. B. Botha, St. Bart.'s; A. S. Bullough, Manch.; C. Campbell, Univ. Coll.; W. B. Clegg, Guy's; P. E. Cresswell, Oxon. and Guy's; E. R. Dansie, King's Coll.; D. A. Davies, Guy's; A. J. S. de Freitas, St. Bart.'s; Shanti Devi, Roy. Free; G. G. W. Elwell, Camb. and Univ. Coll.; E. A. Evans, Camb. and King's Coll.; E. H. Evans, St. Bart.'s; R. Farncombe, St. George's; A. Fearnley, King's Coll.; B. W. Fickling, St. George's; W. J. Finegold, Charing Cross; Joan I. Franklin-Adams, Roy. Free; P. K. Guha, West Lond.; A. Harris, Manch.; E. B. Harvey, St. Thos.; C. A. Hinds Howell, Oxon. and St. Bart.'s; P. W. Houghton, St. Bart.'s; F. Janus, Manch.; G. O. Jelly, Oxon. and Guy's; A. H. Khan, Birm.; J. A. Lewis, St. George's; S. Lilienfeld, St. Mary's; J. R. Miles, Cardiff; Elizabeth C. Morris, Roy. Free; J. F. Morris, Guy's; R. F. Mowll, King's Coll.; S. Mullick, St. Bart.'s; Edith A. S. Parry-Evans, Roy. Free; H. F. Patrick, St. Thos.; Mary Paulosky, West Lond.; O. D. Popat, Lond.; Kathleen G. Priestman, Roy. Free; J. H. Rees and K. E. O. Ringdahl, St. Bart.'s; H. D. H. Robinson, Univ. Coll.; L. M. Rubein, Lond.; J. Schofield, St. George's; B. N. Sinha, Middx.; A. S. R. Sinton, Westminster; J. A. H. Smart, King's Coll.; L. W. Spratt, Camb. and St. Thos.; G. R. Taylor, St. Bart.'s; I. K. Thomas, Lond.; T. G. Tregaskis, St. Bart.'s; M. M. Waldman, Westminster; W. T. Wales, Cardiff; W. Warren, Camb. and St. Bart.'s; N. Whittaker, Camb. and Univ. Coll.; and E. G. K. Williams, Camb. and St. Bart.'s.

Midwifery.—B. Agranat, Guy's; G. W. Alderman, Leeds; H. R. Arthur, St. Thos.; E. Ashman, Guy's; Minnie Atkin, King's Coll.; F. A. S. Austen, Middx.; P. H. Ball, E. B. D. Bangay, and A. B. Barbour, St. Bart.'s; A. J. E. Barlow, Leeds; G. S. Barradell-Smith, Middx.; A. L. W. Bell, Guy's; Bevan, Oxon. and St. Thos.; B. E. Blair, St. Thos.; M. H.

b, St. George's ; S. G. Brook, Camb. and St. Thos. ; A. F. rson, Lond. ; L. H. Buckland, St. Bart.'s ; W. P. Cargill, nch. ; H. B. C. Carter-Locke, St. Thos. ; J. V. Clark, Guy's ; Cohen, King's Coll. ; S. Cohen and D. Craig, St. rt.'s ; T. Csato, Middx. ; J. V. Dacie, King's Coll. ; A. P. le-Bussell, Guy's ; E. R. Dansie, King's Coll. ; B. P. Datta, lcutta ; Debora David, Roy. Free ; J. N. Deakin, Birm. ; H. H. J. de Wytt, Dublin ; J. F. Dow, Camb. and ddx. ; A. J. Dubinsky, St. Mary's ; F. C. Durbin, St. Thos. ; Dyson, Liverp. ; K. G. Eckersley, Leeds ; G. B. Ebbage, ry's ; G. D. Elphick, St. George's ; I. Finer, Guy's ; Barbara Fisk, Roy. Free ; W. P. Fitch, Guy's ; Margaret FitzHerbert, oy. Free ; R. F. Fleming, Bengal and St. Mary's ; J. R. rbes, Guy's ; A. H. T. F. Fullerton, Camb. and Birm. ; E. Furber, Oxon. and St. Bart.'s ; J. Geller, Westminster ; E. Giesen, Guy's ; P. Glazer, King's Coll. ; B. M. Goldsworthy, t. Thos. ; C. N. Gosse, Camb. and St. Mary's ; K. L. Grogono, ond. ; P. Grugeon, King's Coll. ; J. L. Haber, St. Mary's ; L. T. J. Hardwick, Charing Cross ; J. R. G. Harris, Camb. nd Lond. ; J. P. Harrison, Lond. ; G. W. Hearn, St. Thos. ; C. Henry, Middx. ; T. H. Hills, Guy's ; E. D. Hoare, Camb. nd St. Mary's ; J. Holden, Leeds ; C. S. Humphries, Camb. and St. Thos. ; C. A. Hutt, St. Mary's ; W. G. Hutton, Camb. and Leeds ; M. Hynes, Camb. and Middx. ; N. W. Irish, Guy's ; J. E. Ives, Camb. and Univ. Coll. ; E. H. Jones, Guy's ; I. ap D. Jones, Cardiff ; A. E. Jowett, Bristol ; R. Kauntze, Camb. and St. George's ; I. Klinger, King's Coll. ; F. J. D. Knights, Middx. ; A. Lasnick, Univ. Coll. ; B. Lawson, Guy's ; H. Levitt, Charing Cross ; J. F. Lockwood, Guy's ; Dorothy K. Lopez, Roy. Free ; M. A. Loutfy, Cairo and St. Mary's ; P. S. Luffman, St. Thos. ; J. C. McAvoy, St. Bart.'s ; H. M. McGladdery and R. McGladdery, St. Bart.'s ; Margaret I. McHaffe, Roy. Free ; E. M. Mankin and J. I. C. Mason, St. Bart.'s ; J. H. Mayer, Guy's ; Dorothy V. Mazel, Roy. Free ; W. T. M. Moar, Lond. ; L. F. Muldavin and S. J. Navin, St. Mary's ; R. J. Niven, St. Thos. ; C. W. F. Outred, Guy's ; W. O. G. Paget, St. Bart.'s ; G. E. Paxon, Guy's ; A. D. Petro, Camb. and St. George's ; J. B. Phillips, Cardiff ; T. D. Pilcher, Camb. and St. Thos. ; G. B. S. Pimblett, Westminster ; A. R. Pope, Camb. and St. Bart.'s ; A. E. K. Price, Middx. ; Kathleen G. Priestman, Roy. Free ; M. S. M. Rayner, Camb. and St. Thos. ; B. Reeves, Lond. ; L. Reuben, Roy. Free ; J. Revans, Middx. ; Hilda Roberts, Liverp. ; W. W. Roberts, Birm. and Sheff. ; G. S. Robinson, Camb. and Liverp. ; M. G. Robinson, Birm. ; S. Rosof, St. Mary's ; C. G. Roworth, Univ. Coll. ; R. G. Samuel, Camb. and St. Bart.'s ; S. V. Sansom, St. Bart.'s ; R. H. Shah, Manch. and Lond. ; A. Shapiro, Univ. Coll. ; P. N. Shutte, St. Thos. ; A. H. M. Siddons, Camb. and St. George's ; A. Skolar, Middx. ; A. Smiter, St. Mary's ; H. S. C. Smith, Middx. ; B. P. Stone, Camb. and King's Coll. ; N. K. Stott, Oxon. and St. Thos. ; J. H. E. Summerhill, Camb. and Univ. Coll. ; K. Tatz and F. Taylor, Guy's ; J. W. Todd, Middx. ; T. G. Tregaskis, St. Bart.'s ; J. L. Treneman, Liverp. ; J. D. B. Vaile, St. Thos. ; J. E. G. Vincenzi, St. Thos. ; A. R. M. Waffarn, King's Coll. ; A. B. Wayte, Guy's ; Catherine M. Whitestone, Univ. Coll. ; N. Whittaker, Camb. and Univ. Coll. ; C. W. K. Willard, Univ. Coll. ; I. D. C. Williams, Guy's ; S. P. N. Williams, Bristol ; and H. L. Wolfe and J. G. Youngman, St. Bart.'s.

Surgery.—J. Adler, Charing Cross ; C. Anderson, St. Bart.'s ; G. T. Balean, Guy's ; D. M. Blomfield and D. M. Bressler, St. Bart.'s ; Margaret Brodigan, Univ. Coll. ; R. Bruce, King's Coll. ; A. F. Bryson, Lond. ; A. S. Bullough, Manch. ; Margaret M. B. Carey, Roy. Free ; W. P. Cargill, Manch. ; R. S. Carpenter, Lond. ; A. H. Casson, St. Bart.'s ; R. F. Courtin and J. O. Creighton, St. Thos. ; T. Csato, Middx. ; S. M. Davidson, Camb. and St. Mary's ; D. W. Davies, Cardiff and Middx. ; T. F. Davies, Guy's ; E. W. Dunkley, Lond. ; R. S. Ellis-Brown, Guy's ; M. Epstein, St. Bart.'s ; I. A. Feldman, Leeds ; Joan I. Franklin-Adams, Roy. Free ; P. R. Gavin, St. Thos. ; Muriel C. Goodchild, Roy. Free ; W. E. Hadden, St. Thos. ; J. P. Harrison, Lond. ; R. B. Heisch, Camb. and Middx. ; H. F. G. Hensel, Lond. ; C. F. Heys and R. C. Hill, Guy's ; G. S. Hodge, Univ. Coll. ; D. A. B. Hopkin, St. Mary's ; C. Houghton Brown, St. George's ; G. O. Jelly, Oxon. and Guy's ; D. V. John and W. H. Jones, Camb. and Univ. Coll. ; M. D. Kiddon, St. Mary's ; F. H. Lamb, St. Thos. ; J. H. Lawrence, Leeds ; V. Lewis, St. Mary's ; P. T. Liem, St. Thos. ; G. M. Lloyd, St. Bart.'s ; O. Lloyd, Middx. ; I. B. McCrae, Charing Cross ; P. E. C. Manson-Bahr, Camb. and Lond. ; E. C. Marsh, Edin. ; F. H. Masina, Camb. and St. Bart.'s ; K. M. Mayall, Camb. and St. George's ; A. B. G. Mein, Westminster ; S. G. Mobler, St. Mary's ; R. L. Moody, St. Thos. ; Elizabeth C. Morris, Roy. Free ; J. H. Moseley and J. T. Murray-Aynsley, Camb. and St. Thos. ; Anisa Nagi, Roy. Free ; S. Paul, Cape and Guy's ; A. L. Peers, Camb. and Guy's ; Lillian M. Pickford, Univ. Coll. ; A. R. Pope, Camb. and St. Bart.'s ; Kathleen G. Priestman, Roy. Free ; A. W. Probert, Univ. Coll. ; J. J. C. Rainsbury, Sheff. ; J. Rapoport, St. Mary's ; M. S-M. Rayner, Camb. and St. Thos. ; J. W. Redgate, Middx. ; M. G. Robinson, Birm. ; J. S. Ross, Camb. and St. Thos. ; B. D. Sachdeva, West Lond. ; H. H. Samson, Lond. ; J. K. Samuel, St. Thos. ; B. J. Shaw, Birm. ; C. W. T. Shuttleworth, Guy's ; J. Simon, Lond. ; J. H. E. Summerhill, Camb. and Univ. Coll. ; C. Tetlow, Manch. ; Constance M. Vallange, Roy. Free ; H. A. Wallace, Camb. and Univ. Coll. ; J. D. S. Watling, Univ. Coll. ; F. H. Weston, Guy's ; D. O. Wharton, Manch. ; C. W. K. Willard, Univ. Coll. ; and J. G. Williams, Westminster.

Royal College of Physicians of London

Licences to practise (additional to those recorded in our last issue) were on August 2nd conferred on the following candidates :—

E. J. J. Borges, Bombay and West Lond. ; F. I. Evans, Camb. and Guy's ; J. R. Nassim, Oxford and St. George's ; H. N. Perkins, St. Mary's ; and F. F. Rundle, Sydney.

Royal College of Surgeons of England

A meeting of the council of the college was held on August 2nd, with Sir Holburt Waring, the president, in the chair. Mr. L. R. Broster, surgeon to Charing Cross Hospital, was elected a member of the court of examiners in the vacancy caused by the resignation of Mr. Claude Frankau. Dr. Ernest Bulmer, Dr. A. H. Douthwaite, Dr. R. A. Hickling, and Dr. R. A. Rowlands were elected examiners in medicine for the L.D.S.

Mr. Kennedy Cassels, M.A., F.C.I.S., was appointed secretary to the college in succession to Mr. S. Forrest Cowell, who retires at the end of September. Mr. T. W. P. Lawrence was reappointed acting pathological curator for a further period of six months, and Mr. F. H. Bentley was appointed Bernhard Baron scholar during the current quarter. Mr. Wilfred Trotter, F.R.S., was reappointed a member of the executive committee of the Imperial Cancer Research Fund.

Diplomas of membership were granted to the candidates whose names were given last week (p. 286) as recipients of the L.R.C.P., and to those who received the diploma of the Royal College of Physicians on August 2nd. Licences in dental surgery were granted to the following candidates successful in the recent examination :—

Naga M. A. Abul, A. P. Austin, K. C. Baker, A. L. H. Bakry, C. F. Ballard, R. O. Barber, Beatrice M. Bell, Shaker Botros, J. C. Carr, F. L. Ferris, W. R. Foreman, Marjorie G. Frost, Harry Gill, D. A. G. Greensted, Werner Grünthal, A. A. Hassan, A. G. Heberlein, Herman Kanter, J. H. Kendall, J. B. Knight, Mitchel Lang, W. B. Lewis, W. J. Littleton, R. W. Lovel, Benito Machado, J. C. Manchanda, L. C. Mandeville, R. S. Martin, C. E. A. Mason, A. E. W. Miles, H. E. Nathoo, D. D. Nogid, T. C. O'Flanagan, G. B. Oliver, E. J. Parks, M. F. Porterfield, L. P. Quenet, Martin Radford, E. E. H Sampson, Harold Stewart, Margaret E. Stewart, A. R. Thatcher, J. L. Thompson, D. P. Walther, D. U. Warburton, W. E. A. Watson, and R. A. E. Williams.

University of Cambridge

During June and July titles of degrees (B.Chir.) were conferred on C. M. Cavell, R. A. Kellgren, and D. J. Thompson.

University of London

At a meeting of the senate on July 18th it was resolved that university readerships in medicine, surgery, obstetrics and gynæcology, pathological chemistry, and bacteriology should be instituted at the British Postgraduate Medical School, Hammersmith. Particulars of these posts will be found in our advertisement columns.

Recipients of grants from the Thomas Smythe Hughes medical research fund and the Beaverbrook fund include Prof. C. A. Lovatt Evans, Dr. R. C. Lightwood, and Dr. T. W. Mimpriss. Applications are invited for the William Julius Mickle fellowship, which is awarded annually to the graduate of the university who has in the opinion of the senate done most to advance medical art or science within the preceding five years. Applications in proper form must be received by Oct. 1st, and particulars may be had from the academic registrar.

The Sharpey scholarship in physiology at University College has been awarded to Dr. D. H. Lee.

Dr. W. E. Roper Saunders, divisional medical officer for the London County Council, has obtained the diploma in public administration.

Fellowship of Medicine and Post-Graduate Medical Association

A lecture-demonstration on hysteria will be given by Dr. Clark-Kennedy at the Medical Society of London, 11, Chandos-street, Cavendish-square, W., at 2.30 P.M. on Tuesday, August 14th. On August 21st Dr. Clark-Kennedy will deal with asthma. Mr. Alan Gairdner will give a short course of demonstrations on the treatment of fractures at St. George-in-the-East Hospital, Raine-street, at 2.30 P.M., from August 13th to 17th. The course will include fractures of the upper extremity, fractures of the spine and pelvis, and fractures of the lower extremity. A course in infants' diseases which will deal principally with nutritional disorders and dietetics will be held at the Infants Hospital, Vincent-square, London, S.W., from Sept. 3rd–14th. Daily instruction in various branches of medicine and surgery is provided by the panel of teachers, and further particulars may be had from the secretary of the Fellowship, 1, Wimpole-street, London, W.1.

National Hospital, Queen-square

A course of lecture-demonstrations on neurology will be held at this hospital from Oct. 8th to Dec. 7th. It will include demonstrations of anatomy, physiology, and pathology, and demonstrations on post-mortem materia at 12 noon; lectures on the principles of neurology and on diseases of the nervous system at 3.30 P.M.; and demonstrations of clinical methods of examination at 5 P.M. A second course will be held from Jan. 28th to March 29th. Further particulars may be had from the secretary of the hospital, Queen-square, London, W.C.1.

Post-graduate Course in Newcastle

Under the auspices of the University of Durham College of Medicine, Newcastle-upon-Tyne, a post-graduate course will be held from Sept. 10th to 21st. There will be lectures and demonstrations daily from 9.30 A.M. to 4 P.M. from Mondays to Fridays, and they will all be given at the Royal Victoria Infirmary, except those on Monday, Tuesday, and Thursday afternoons, when visits will be paid to the *Babies* Hospital and *Princess Mary* Maternity Hospital. The programme of the course may be had from the registrar of the College.

Instruction for D.P.H.

The medical officer of health to the London County Council announces that a three months' course of lectures and demonstrations on clinical practice and in hospital administration will be given at the North-Western Hospital, Lawn-road, Hampstead, N.W., by Dr. A. Joe, the medical superintendent, on Mondays and Wednesdays at 9.30 A.M., and alternate Saturdays at a time to be arranged, beginning on Monday, Oct. 1st. A similar course will be given at the Brook Hospital, Shooter's Hill, Woolwich, S.E., by Dr. J. V. Armstrong, the medical superintendent, the dates and times being the same. Applications should be made to the medical officer of health, London County Council, Public Health Department (Special Hospitals), the County Hall, S.E.1.

Appointments

HENDERSON, ALEXANDER, M.B. St. And., D.P.H., has been appointed Assistant Medical Officer to the County of Aberdeen.

HERITAGE, KENNETH, M.S. Lond., F.R.C.S. Eng., Honorary Surgeon to the Saint John's Hospital, Lewisham.

MCCRAE, R. H. B., M.B. Glasg., Medical Referee under the Workmen's Compensation Act for Wick Sheriff Court District.

SHARPE, J., M.B. Glasg., D.P.H., Deputy Medical Officer of Health for Leeds.

WRIGHT, Prof. HEDLEY D., D.Sc., M.D., Bacteriologist for City of Liverpool.

Infants Hospital, London, S.W.—The following appointment are announced:—

FLETCHER, H. MORLEY, M.D. Camb., F.R.C.P. Lond., and STILL, G. F., M.D. Camb., F.R.C.P. Lond., Consulting Physicians;

ADDISON, O. L., M.B. Lond., F.R.C.S. Eng., and WAUGH, G. E., M.D. Lond., F.R.C.S. Eng., Consulting Surgeons.

Certifying Surgeons under the Factory and Workshop Acts: MCCLELLAND, T. A., M.B. Belf. (Warrington); MACFARLANE, E. P., M.B. Glasg. (East Kilbride, Lanark); MCLEAN, R., M.B. Glasg. (Carluke District, Lanark).

Vacancies

For further information refer to the advertisement columns

Altrincham General Hospital.—Sen. H.S. At rate of £150.

Birkenhead General Hospital.—Sen. H.S. At rate of £150. Also Second H.S., H.P., and Cas. O. Each at rate of £100.

Birkenhead Municipal Hospital.—Deputy Med. Su[illegible] Also Res. M.O. £300.

Birmingham, Ear and Throat H[illegible] d H.S. £150.

Birmingham Royal Cripples' [illegible] H.S. £200.

Bradford, Grassington Sanatoriu[illegible] 's.—[illegible]

Bradford Municipal General H[illegible] H.S.'s. Each at rate of £15[illegible]

Buxton, Derbyshire, Devonshire [illegible] —A[illegible] At rate of £150.

Cardiff, Glan Ely Tuberculosis H[illegible] Sc[illegible] £500. Two H.P.'s. Each at [illegible]

Cardiff, King Edward VII. Welsh N[illegible] Thr[illegible] O.'s. Each [illegible]

Carlisle, [illegible] *Infirmary.*—H[illegible]

[illegible] *Hospital.*—[illegible] [illegible], *S.W.*

Charing Cross Hospital, W.C.—H.P. to Radiological Dept. At rate of £50.

Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.

Connaught Hospital, Walthamstow, E.—Sen. Res. M.O. At rate of £150.

Dudley, Guest Hospital.—Second H.S. £170.

East Ham Memorial Hospital, Shrewsbury road, E.—H.P. At rate of £150. Also Res. M.O. At rate of £200.

Exeter, Royal Devon and Exeter Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.

Finsbury Metropolitan Borough.—Asst. M.O.H. £600.

General Lying-in Hospital, York-road, Lambeth, S.E.—Jun. Res. M.O. and Anæsthetist. At rate of £100.

Great Yarmouth General Hospital.—H.S. £140.

Greenwich Metropolitan Borough.—Sen. Asst. M.O. for Maternity and Child Welfare Work. £600.

Guildford, Warren-road Hospital.—Res. Asst. M.O. At rate of £250.

Ilford, King George Hospital.—Pathologist. £500.

Institute of Ray Therapy, &c., 152 Camden-road, N.W.—Part-time M.O. At rate of £100.

Lincoln County Hospital.—H.S. At rate of £150.

Liverpool City.—Res. Asst. M.O. £200.

Liverpool, David Lewis Northern Hospital.—Cas. O. and H.S. At rate of £120 and £80 respectively.

Liverpool, Hahnemann Hospital, Hope-street.—Res. M.O. At rate of £125.

Liverpool, Royal Southern Hospital.—Res. Orthopædic H.S. M.O. to Spec. Dept., and Res. Anæsthetist. Each at rate of £60.

London Jewish Hospital, Stepney Green, E.—Hon. Clin. Assts.

London University.—University Readerships. Each £500. Also William Julius Mickle Fellowship. £200.

Maidstone, West Kent General Hospital.—H.P. £150.

Manchester, Ancoats Hospital.—H.S. At rate of £100. Also Surg. and Med. Reg. Each at rate of £50.

Manchester Babies Hospital, Burnage-lane, Levenshulme.—Sen. Res. Medical Officer. At rate of £125.

Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.

Manchester Centre, National Radium Commission Scheme.—Asst. Radium Reg. £400–£500.

Manchester, Christie Hospital and Holt Radium Institute, Withington.—Res. Surg. O. At rate of £150. Also Hon. Radiologist.

Manchester Royal Infirmary.—First Asst. for Clinical Laboratory. £350.

Manchester, St. Mary's Hospital.—Hon. Surgeon for Children's Dept.

Middlesbrough, North Riding Infirmary.—H.P. At rate of £125.

Middlesex Hospital, W.—Radiologist. £500. Also Asst. Radiologist (Diagnostic). £100.

Newcastle-upon-Tyne Eye Hospital.—Sen. Res. H.S. £300.

North Kensington Women's Welfare Centre, Telford-road, W.—Medical Officer.

Norwich, Norfolk and Norwich Hospital.—Cas. O. and H.S. £120. Also H.S. to Spec. Depts. £120.

Plymouth City Hospital.—Deputy Med. Supt. £450.

Plymouth City (General) Hospital.—Jun. Asst. M.O. £250.

Plymouth City and Port.—Asst. M.O.H. £500.

Poplar Hospital for Accidents, East India Dock-road, E.—Second Res. O. £175.

Preston County Borough.—Asst. School M.O. £500.

Preston, County Mental Hospital, Whittingham.—Res. Jun. Asst. M.O. £500.

Preston and County of Lancaster Royal Infirmary.—Res. Surg. O. £300. Also H.S. and Cas. O. Each at rate of £150.

Preston, High Carley Sanatorium, near Ulverston.—Asst. Tuber. M.O. £450.

Queen Mary's Hospital for the East End, Stratford.—H.S. Also Cas. O. £150.

Reading, Royal Berkshire Hospital.—Res. Anæsthetist. At rate of £150.

Royal College of Physicians, Pall Mall East, S.W.—Milroy Lecturer.

Royal Eye Hospital, St. George's Circus, Southwark, S.E.—H.S. and Asst. H.S. At rate of £150 and £100 respectively.

Royal Naval Medical Service.—Ten M.O.'s.

Sheffield Children's Hospital.—H.P. At rate of £100. H.S. £100.

Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Asst. H.P. £125.

Surrey County Council.—Asst. M.O. £600.

Swansea General and Eye Hospital.—Cas. O. At rate of £150.

Taunton and Somerset Hospital.—Hon. Physician.

Warwick, King Edward VII. Memorial Sanatorium, Hertford Hill.—Jun. Asst. M.O. £200.

Warwickshire and Coventry Joint Committee for Tuberculosis.—Asst. Tuber. O. £600.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £15[illegible]

Westminster Hospital, Broad Sanctuary, S.W.—Wander Scholarship in Diseases of Children. £250.

IN[illegible]O "THE LANCET," VOL. I., 1934

[illegible] d Title-page to Vol. I., 1934, which [illegible] ith the issue of June 30th, is now in [illegible] copy will be sent gratis to sub[illegible] of a post-card addressed to the [illegible] NCET, 7, Adam-street, Adelphi, [illegible] who have not already indicated [illegible] Indexes regularly as published

ADDRESSES AND ORIGINAL ARTICLES

PROBLEMS OF GALL-STONES

BY E. R. FLINT, M.B. Leeds, F.R.C.S. Eng.
SURGEON TO THE GENERAL INFIRMARY AT LEEDS

IN abdominal surgery apart from acute appendicitis the pathological condition most often found is cholelithiasis and its complications; yet, frequent as the lesion is and common as are the remedial operations performed, there are many problems relating to both which are not satisfactorily solved. For example, as regards the former, are gall-stones primarily due to some chemical disturbance, and, if so, what nature, or do they form secondarily to an infective cholecystitis? As regards the latter, what are the reasons for the appalling mortality of 14·65 per cent. following operations for stone in the common duct? (This is the death-rate arrived at from a collective investigation into the subject made on behalf of the Association of Surgeons of Great Britain and Ireland recently.) Again, why should infection play such a prominent part in causing those deaths which may follow any kind of operation on the biliary passages?

What do we know about the ætiology of gall-stones? There are two predominating views—the infective and the metabolic. According to the first the gall-bladder is infected by one or other of several routes—the hæmatogenous being that most generally favoured. Following the cholecystitis so induced gall-stones develop. Those who uphold the second theory say that owing to some chemical upset biliary constituents separate out to form stones, and subsequently may or may not give rise to cholecystitis. It is important to get the ætiology right, otherwise we cannot expect to progress with preventive treatment; in other words, which is the cart and which the horse?

It is generally conceded that the single cholesterin stone has a metabolic origin; I think it is beginning to be agreed that the pigment and mulberry stones do not owe their origin as a rule to cholecystitis, and the combination stone, which appears as the result of infection, is in the first place a solitary cholesterin stone and therefore metabolic. It is held, however, that if all the cases in which a metabolic origin is conceded are subtracted from the total number of cases in which stones are found, there is a fairly large credit balance in favour of the multiple-faceted stones; this is supposed to make it evident that the commonest occurrence is for cholecystitis to antedate stone-formation.

THE INFECTIVE THEORY

A great impetus was given to the infective theory by E. C. Rosenow and later by A. L. Wilkie, of Montreal, from the experimental side. Briefly the results are these: Cultures were made from the cystic gland obtained from the human subject in cases of cholecystitis; the organisms grown were streptococci in 86 per cent. of the cases. Suspensions of these organisms were made of 250 millions to the cubic centimetre. About 2 c.cm. of the suspension were repeatedly injected into the veins of rabbits with the result that a progressive chronic cholecystitis was caused in most cases; if the cystic duct had been previously ligatured small calcium and cholesterin stones formed, or cholesterin stones only if the duct was left patent

These experiments appear rather convincing, but so far as I am aware they have not been substantiated further; moreover, the animals used were rabbits, which seem to be rather peculiar in that gall-stones can be produced in them by prolonged feeding with cholesterol—which, I believe, has never been accomplished in any other animal. Also I find it hard to believe these repeated massive injections reproduce human ætiological conditions. It is quite easy to understand they can cause cholecystitis; it is also possible to cause cholecystitis chemically by intravenous injections of Dakin's solution; but it is quite another thing to suggest human cholecystitis has a like origin to either method.

I have again and again sent the human gall-bladder and cystic gland to be cultured after removal at operation, and only on the rarest occasions got a growth of streptococci; in a few cases, mostly acute, *Bacillus coli* have been grown, but for the most part the cultures have been negative, and this is the experience of many others who have interested themselves in this subject.

If it be granted for the moment that streptococcal infection occurs, where do the organisms come from? It is suggested they are set free from the teeth, tonsils, sinuses, appendix, and pelvic organs, to mention a few of the multiplicity of foci. If it is the pelvic organs we should expect married women to be relatively more often the victims of gall-stones than spinsters, and though this is generally believed to be the case, reliable statistics do not substantiate this belief, as D. M. B. Gross has shown. A. F. Hurst, too, has come to the conclusion that this is an incorrect statement.

As regards the other sites, the surgical and dental industry, which has been going on here for many years, has reduced the incidence of gall-stones not at all—which is rather odd if the premiss is correct.

CLINICAL EVIDENCE

Experimental work on animals may be suggestive, but it cannot be considered conclusive, at any rate so far, in its application to the human being, and as we are unable to repeat such experiments on the human subject we have to rely largely for our information on clinical (including operative) evidence. Unless notes are taken with the specific object of determining whether biliary colic or cholecystitis was the initial symptom they may not be very helpful, and, too, patients may be excused if they are rather hazy about events which happened maybe 20 years ago. Again, operative notes seldom give precise information as to the character of the stones found. But taking the notes for what they are worth in an analysis of 300 cases of operations on the gall-bladder and ducts, in which stones were present in 252, I found 106 began with violent pain and in 74 of these the attack appeared to be typical biliary colic. In 94 the patients complained first of indigestion and in the other 100 the first symptom was not definitely expressed. In the 94 cases we are on rather uncertain ground, because though cholecystitis probably accounted for the first symptoms yet it is possible for stones to lie quiet until by impaction or constant fretting of the gall-bladder they promote inflammation. In the 100 indeterminate cases the proportional incidence was probably much the same as in the others. It seems fair to say, therefore, that in about half the cases stone almost certainly antedated infection of the gall-bladder. This receives support from my cases done in the last 15 months, in which the special points in the history have had more particular attention; in this series of 100 cases colic was the initial symptom in 45 and indigestion in 40; in 15 there was uncertainty.

The metabolic origin of gall-stones is emphasised further by other considerations; for example, the commonest operative finding in acute cases is a single cholesterin stone impacted in the neck of an acutely inflamed gall-bladder; in these cases it seems certain the gall-stone is the primary condition, and it is in the younger patients one finds this lesion most frequently. Moreover, it is quite common to find gall-stones when there has been no complaint of any trouble suggesting their presence, especially when operating for ovarian cysts or uterine fibroids. Again, they are found not infrequently post mortem when the clinical notes have given no indication of their presence. In 2731 autopsies at the General Infirmary at Leeds there were 20 per cent. with either gall-stones or strawberry gall-bladders in cases over 40 years of age; of these 211 showed liposis. I do not know the significance of the strawberry gall-bladder, but I am sure of this from my own experience, that organisms virtually never grow on the ordinary media when culturing is attempted from the gall-bladder wall; that flatulent indigestion of the type one associates with cholecystitis is a part of the clinical history; and that the symptoms clear up after cholecystectomy. There were 28 cases of strawberry gall-bladder in my last 141 cases of cholecystectomy and in 9 stones were also present. Lastly, I can recall 2 cases in which a pure cholesterin stone has been removed from the ampulla of Vater in association with faceted stones in a chronically inflamed gall-bladder; this suggests the possibility of a metabolic stone passing into the intestine leaving behind all the appearances of infection for which it was primarily responsible, and thus swelling fallaciously the statistics of the infective theory.

As to the nature of the metabolic disturbance, I have not the knowledge to discuss this properly; it is probably related to cholesterol and bile-salts in some way, that is to say a liver rather than a gall-bladder matter. Any theory, however, must explain at least two clinical facts—namely, the association of gall-stones with obesity and femininity. It is not easy to see how infection can do this.

THE HIGH MORTALITY

The question of the mortality, to which I have referred above, is a surgical affair, but not only, and in my opinion not chiefly, one of operative technique. No doubt technical skill in operations on the biliary tract has more to do with keeping down the mortality-rate than in most other parts of the body, but even so I believe getting the patient ready for operation is more important still. I should say that probably more than half of the 14·65 per cent. mortality quoted at the Association of Surgeons' meeting is due to inadequate preparation. My particular interest in this aspect of the subject covers a period in which I have done 150 gall-stone operations—114 cholecystectomies with 3 deaths (2·6 per cent.), 34 choledochotomies with 2 deaths (5·8 per cent.), and 2 cholecystotomies with 1 death; these figures are rather more than half what they were before this period. The essential points to observe are: first, to allow ample time for acute symptoms to subside whether these are inflammatory as in cases of cholecystitis or obstructive as indicated by jaundice—this may mean postponing operation for weeks; secondly, to employ the waiting time in repairing liver damage, kidney function, and less tangible injury for which dehydration is largely responsible. It is very seldom indeed that immediate operation is necessary in gall-stone surgery.

Anatomical abnormalities of the ducts and blood-vessels are very common in the biliary tract region; this, together with the embarrassingly difficult access at times, and the importance of the structures being dealt with, make gall-stone surgery the most technically difficult of all abdominal work, especially when pathological distortions are superimposed. Often as it has been said, it cannot be too frequently repeated that nothing should be divided until it has been identified; neglect of this fundamental rule is responsible for most of the operative catastrophes. There is another point which I think needs emphasising—it is in my experience impossible in something like 10 per cent. of cases to be sure by palpation alone whether or not there is a stone in the common duct. This is especially so where the head of the pancreas is hard and nodular as it not infrequently is in association with gall-stones. In 3 of my last 30 cases of choledochotomy I found a stone or stones in the common duct only after opening it; in each case I could feel no stone, but my suspicions were aroused by the size and texture of the duct and the nodularity of the pancreas. This opinion is supported by post-mortem records; during 6 years there were 33 autopsies at the Leeds General Infirmary on cases which had died after cholecystectomy, no operation having been done on the common duct, and in 6 there were stones found in the common duct presumably undiscovered and certainly left at operation. Again, in 7 of the 34 choledochotomy cases referred to above the gall-bladder had been removed at a previous operation, and this almost certainly means that the stone found on the second occasion had been overlooked at the first.

The relationship between infection-and mortality-rate is a very obvious one; in 75 post-mortem examinations of patients dying in the Leeds General Infirmary after operations on the biliary passages 27 showed generalising or gross local peritonitis and 17 broncho-pneumonia, which is more often than not a terminal manifestation of infection elsewhere. Most of these deaths, I think, are preventable by delaying operation until the acute stage is well over. The low resistance of fatty tissue to even minimal infection, combined with the large wound which has to be made and the amount of necessary manipulation, are sufficient reason in my opinion for inciting peritonitis and wound infection in gall-stone cases in the acute period, where a stone in the neck of the gall-bladder and acute inflammation of the organ are commonly found.

So far as the common duct cases are concerned there were in the same series 10 deaths due to infective cholangitis and hepatic damage. It is only seldom one is obliged to interfere surgically in the acute period of cholangitis, and it is fortunate that this is so, for many of these patients, from the surgical point of view, are the worst possible risks; if immediate operation should be deemed imperative it should be limited to drainage of the common duct (leaving the *obstruction to be dealt with later*) combined with blood transfusion and continuous intravenous saline and glucose.

So far as the administration of fluid is concerned I want to emphasise particularly the value of the intravenous method. I have had a considerable experience of this, and for those cases which really require fluid I am certain it has very great advantages over any other parenteral method; 50 pints can be given without trouble in 4 or 5 days and is for the most part retained, since there is no obvious sweating or *proportionate increase in urinary excretion*. Moreover, we know it is being added to the body fluids in the same quantities as given; this is by no means the case when the other methods are employed.

THE TOXÆMIAS OF PREGNANCY*

BY DAME LOUISE McILROY, D.B.E., M.D.,
D.Sc. Glasg., D.Sc. Lond., F.C.O.G., M.R.C.P.

DIRECTOR OF THE OBSTETRICAL AND GYNÆCOLOGICAL UNIT, ROYAL FREE HOSPITAL, LONDON; PROFESSOR OF OBSTETRICS AND GYNÆCOLOGY IN THE UNIVERSITY OF LONDON

II.—THE SIGNIFICANCE OF SYMPTOMS AND THEIR TREATMENT

General Outline of Treatment

No hard-and-fast rules for the treatment of toxæmia can be laid down, as its manifestations are varied in the case of each individual patient. In obstetrics, as in every other branch of medicine, experience teaches us that the patient is to be treated and not the disease. Prevention of toxæmia is obviously what we should more especially aim at now that the majority of cases of pregnancy are coming under early medical observation. With careful investigation and a knowledge of the normal, the slightest deviation from health will be taken as a danger signal and preventive measures employed in order to avoid complications. It is just this attention to detail and the supervision of the hygiene of pregnancy that is going to lower the maternal mortality of the country. Even now we can see the difference between the mortality in "booked" or supervised patients and those "emergency" patients who have had no antenatal care.

Careful attention in every patient to the condition of the teeth and skin, to the diet, and to the absence or presence of vomiting, hypertension, headache, and ocular symptoms, will go far in mitigating or eliminating the serious types of toxæmia such as acidosis and eclampsia. Sudden or fulminating attacks of toxæmia may occur especially in the later months of pregnancy. These cannot always be foreseen or prevented, but they are rare and in most cases when investigated will be found to be due to some gross error in diet. One must remember that pregnant women are not necessarily immune from any intercurrent pathological condition because of their pregnancy, although critics of our methods of antenatal care seem to demand from us a state of complete immunity for these women. Errors of diet have their consequences at any age and in either sex, but such errors have much more serious consequences if indulged in during pregnancy. The general treatment of toxæmia resolves itself into: (1) the careful avoidance by dieting of excessive or unsuitable food intake and the adoption of a diet which will make up for deficiences resulting from fœtal demands upon the maternal tissues; (2) the elimination of harmful substances by physiological rest and the suitable stimulation of those organs which are concerned with excretion. Right through the management of pregnancy and the treatment of toxæmia at any period these two principles must be our guide. We all differ as to details and put forth arguments in favour of some particular line of treatment which we fancy for the moment. Perhaps in no branch of medicine has fashion played such a part as in the treatment of the toxæmia of pregnancy. Drugs are excellent and in many cases necessary, but we shall do more by proper dieting and elimination than by any other means. Sedatives may be necessary but their employment is an indication of our ineptitude in stimulating physiological function. The less dependence we have on drugs and on interference with natural laws the more information will we be induced to seek in order to bring about a normal condition of affairs.

Diet

Much attention of late has been devoted to the importance of diet in the prevention and treatment of toxæmia, and we now find that our results are much improved as compared with those which we associated with the more or less indiscriminate administration of drugs. During pregnancy the diet should be as far as expedient that to which the patient has been accustomed. It ought to be of a plain mixed variety and should include a supply of green vegetables and fresh fruit. Preserved foods are deficient in vitamins, and are therefore less nourishing. Cereals contain a considerable quantity of calcium and other minerals. E. Mellanby, however, advises that their consumption should be "protected" by the addition of milk. In the case of well-nourished patients, butcher's meat and eggs should be taken sparingly, if at all, in the last three months of pregnancy, in order to relieve the strain of protein excretion; fish, chicken, and cheese are good substitutes. In addition it is found as a matter of experience that there is less rigidity of the fœtal head on a reduced protein diet and as a consequence labour is rendered easier. There is a popular fallacy that the pregnant woman must "eat for two." This creed has been the means in some cases of over-eating and toxæmia. Smaller meals at frequent intervals are advisable in cases of digestive embarrassment; fluids are necessary but should be restricted if there is a tendency to œdema of the tissues. A mixed carbohydrate diet with a supply of sugar will prevent the onset of acidosis. E. Mellanby makes the following suggestion for a diet in pregnancy: Milk 1–2 pints, green vegetables once or twice daily, 1 to 2 eggs daily, sea fish (for iodine content) twice weekly or more frequently. Calf's liver can be given once a week; the rest of the diet is to be within reason as the patient wishes. If deficient it should be supplemented with cod-liver oil ʒ ii. daily. If on the other hand it is found necessary to limit food intake, the advice is often not welcomed by the patient as it means an irksome daily restriction. Bingham[1] advises ordinary light diet with a very moderate diet on alternate days only. This should consist of a cracker and glass of milk at three-hourly intervals, and I suggest the addition of two oranges. If attention is paid to limitation of quantity in the diet of mothers who are overweight or gaining excessive weight in pregnancy it will be found that in addition to the improvement in maternal welfare the fœtus derives a marked benefit. The child may be born below the average weight but it will have had an easier passage through the parturient canal and its postnatal loss in weight will be found to be less. Part of such loss in weight, which we find more marked in large infants, is now said to be due to reduction of excess of fluid in the tissues. Smaller and better babies are, therefore, to be desired, but we must exercise due care in this direction. Reduction in the expectant mother's weight can be brought about not only by dieting but by open-air exercise—two to three miles should be walked daily.

We are inclined to forget how dull and restricted the life of a woman is in the later weeks of pregnancy. She is cut off from most of her interests and is frequently very bored with life, whilst at the same time she has plenty of leisure to contemplate what the immediate future has in store for her. She is filled with fears about herself and anxieties about her baby. If we give her some interest in her food and make her take walking exercise up till almost the onset of labour we occupy her time and thoughts and accomplish much more than if we had only given her a prescription for the chemist. If her diet has been deficient and there is not time to make it up we may have to supplement with calcium, iodine, iron, and vitamins in the form of marmite, cod-liver oil, radiostoleum, and other preparations. My favourite prescription is 10 drops of concentrated radiostoleum in the juice of an orange once daily. If the patient is restless or sleepless or the fœtus is disturbing in its movements, she is probably deficient in calcium and this must be given. Calcium will also relieve the muscular cramp of pregnancy. One-grain doses of thyroid extract are beneficial in some of the skin affections of pregnancy, at the same time attention being given to dieting and the avoidance of excessive protein intake. Excessive purgation is a mistaken means of assisting elimination. Constipation is associated with vitamin and endocrine deficiency and should be treated on rational lines. One of the mild forms of purgation for pregnant women is a glass of warm water mixed with an infusion of senna pods to be taken early in the morning before breakfast.

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*Second Ingleby lecture delivered in the University of Birmingham on May 3rd, 1934. The first lecture appeared in THE LANCET last week.

One cannot leave the subject of diet without reference to the care of the teeth. Pyorrhœa is a sign of vitamin deficiency. Caries is predisposed to by vitamin and calcium drain. Mrs. Mellanby's[25] work on this subject is well known. Every pregnant patient should be treated by a dentist if there is evidence of caries at all, even if only in one tooth. Oral sepsis is a predisposing cause of throat affections, toxæmia, and puerperal sepsis, and also of inability to suckling. Extractions do not produce abortions by any means, and in antenatal care dental treatment is one of the most valuable aids we possess. A condition of admission to the wards in the Royal Free Hospital for confinement is that consent should be given for dental treatment during pregnancy.

Significance and Treatment of the Symptoms and Signs of Toxæmia

Vomiting is perhaps one of the most frequent and important symptoms of toxæmia. It may occur at any period of pregnancy. It also occurs during labour in some cases, but is rarely observed in the puerperium. It may vary in intensity from the mild vomiting or morning sickness of pregnancy to the profound vomiting which is the result of toxæmia of both hepatic and renal origin. It is of more frequent occurrence in the first three months of pregnancy than in the latter months.

MORNING SICKNESS

In the examination of 100 consecutive antenatal cases in the Royal Free Hospital which were more or less normal, morning sickness had occurred in 50 per cent. In 14 out of 30 cases of eclampsia morning sickness was absent. In eight cases (four of which died) it was slight. I need not dwell upon the theories in regard to the causation of morning sickness. It is quite possible that acidosis may be closely associated with the symptom. The treatment, therefore, is to have a supply of barley sugar at the bedside and for the patient to eat the sugar in the early morning and also drink a glass of warm water. Attention to the functions of the intestine is desirable, but the indiscriminate administration of purgatives is to be condemned. The diet should be regulated in order to supply the vitamins which are necessary for normal metabolic function.

VOMITING IN EARLY PREGNANCY

This when frequent or prolonged usually denotes a condition of carbohydrate deficiency associated with an anxiety neurosis. Hyperemesis gravidarum should not be classified as a disease; it is a symptom of severe toxæmia, occurring early in pregnancy and is a very rare condition. Persistent vomiting when present in earlier pregnancy is proved by treatment to be due, in the majority of cases, to an anxiety neurosis. When patients suffering from worry and domestic anxieties are admitted to hospital or a nursing-home the vomiting soon ceases. It is a true "home sickness." Treatment carried out in hospital to some extent results in failure if the patient is kept in her home surroundings. I have not infrequently seen examples of a patient reacting quickly to treatment in hospital who, when sent home, had a recurrence of the symptoms, which again vanished on readmission to hospital. Investigation of all cases of vomiting should be thorough in order to ascertain if hepatic or renal damage is present. The persistent vomiting of pregnancy in a multipara not infrequently suggests renal damage. In a primigravida it is more likely to be early and hepatic in origin. The routine treatment is rest in bed, absolute freedom from worry, and adverse physical sensory and mental stimuli. For the first 24 or 48 hours the patient is kept on water with glucose and fruit juice. If the vomiting persists, washing out of the stomach combined with the administration of glucose solution per rectum is helpful in some cases. As soon as possible small carbohydrate meals should be given, beginning with dry biscuits, fresh butter, and barley sugar. This is to be followed by light mixed diet with limited protein. Sedatives may be necessary if the patient is worn out and sleepless. Calcium should be given either intramuscularly as calcium gluconate, or as calcium sodium lactate. The combination of calcium, potassium citrate, and bicarbonate of soda in a tumbler of water, as advised by Cameron,[26] is effective if the vomiting is not severe. In more severe cases no food or fluid should be given by the mouth. Fluids administered per rectum containing glucose and bicarbonate of soda are essential in order to avoid the dehydration which is likely to take place. Vomiting may start as a neurosis and cause acidosis from starvation. This in its turn keeps up the vomiting. The urine should be examined for albumin and the ocular fundi for retinal changes and the blood pressure taken for hypertension. If there is a positive result and the signs of toxæmia are present in a marked degree it will be necessary to empty the uterus, a procedure, however, which is rarely required.

HYPEREMESIS GRAVIDARUM

In this type of vomiting the toxæmia is profound and progressive. There is rapid dehydration of the tissues and not infrequently emaciation and jaundice are present. The blood pressure may be low, in which case the ovum should be removed without delay. No laboratory tests are required to inform us that such a patient is very seriously ill. Munro Kerr[3] points out that when vomiting ceases in severe cases the possibility of paralysis of the cerebral centre has to be considered, a fatal ending being not far distant. I have not seen one case of this type of severe vomiting in the last ten years, although a very large number of cases of vomiting are admitted to the wards for treatment. A considerable degree of success in carrying out treatment depends upon the assurance given to the patient that she has nothing to fear and that she will get well. Theobald[23] is opposed to the fact that vomiting is due in most cases to an anxiety neurosis, but there is no doubt that isolation and freedom from worry has a remarkable effect in bringing about a cure in the majority of cases; without this psychic adjunct dieting alone would be ineffectual. Fyfe Anderson[27] points out that vomiting is sometimes an evidence of pyelitis, and that the colon bacillus should be sought for in the urine.

In some cases vomiting in pregnancy may be due to gastro-intestinal conditions unconnected with pregnancy. Treatment on the usual lines for digestive trouble—viz., by bismuth subnitrate, lactopeptone combined with bicarbonate of soda—is of benefit and may cure the condition. Colon lavage is always useful in the treatment of vomiting.

HEARTBURN

This is sometimes a sign of grave impending toxæmia. I have found good results from advising small dry meals with low fat content. Fluids should be given between meals. This gives the gastric juices an opportunity to act. Dilute hydrochloric acid in 15-30 drop doses during meals gives relief in cases where hypo-acidity is present. Fyfe Anderson and Brian Rayner[28] have written on this subject.

HEADACHE

This if persistent may be due to anxiety, hypertension, eyestrain, or intracranial tension, and should never be overlooked. It is sometimes the first danger signal of the onset of eclamptic convulsions. Rest in bed is necessary in some cases and careful dieting of the carbohydrate type. If it is very severe lumbar puncture may give relief. Calcium lactate or calcium gluconate have also been given with good result. Pain on the whole is a rare symptom in pregnancy. It is present in severe forms of toxæmia in the region of the epigastrium and is due to tension under the liver capsule owing to small hæmorrhages. General treatment brings relief.

HYPERTENSION

This is frequently present and in toxæmia of the renal type may be persistent in spite of treatment. It may or may not be present in hepatic toxæmia, but in some of these cases the blood-pressure readings are found to be abnormally high. As a rule it reacts quickly to treatment. In persistent hypertension cardiovascular complications are present and cerebral hæmorrhage may occur. Hypertension if it does not yield to treatment is an indication for termination of the pregnancy; it is associated frequently with albumin and other signs of toxæmia, and in severe cases the blood pressure may fall rapidly. I have seen this occur before death in eclampsia as the result of heart failure. I have always been rather afraid of the rapid reduction of blood pressure by drugs such as veratrone, as there is danger of heart failure. Hypertension must have some protective function although we look upon it as an indication that the patient's condition is serious. In cases of toxæmia with high blood pressure I have been against excessive fluid administration intravenously or otherwise. I feel sure that blood volume increased in this way tends to aggravate the condition. Venesection, therefore, has an important place in the treatment of these cases.

Osman[17] points out the significance of essential hypertension in the follow-up of cases of toxæmia of pregnancy, and thinks that it might be a symptom in itself, and that it does not always indicate kidney damage. He refers to Cushing's statement that hypertension in eclampsia and also essential hypertension suggests an increase in the function of the posterior lobe of the pituitary.

Œdema is usually accepted as a sign of renal damage, but we have already seen in the previous lecture that in its association with increase of weight it is due in some instances to excessive food and fluid intake, in particular of sodium chloride. Rest in bed, regulation of the diet, and general treatment especially with small doses of magnesium sulphate will have a beneficial effect. Restriction of fluids also has a marked effect when balanced equally with the urine output. In œdema due to cardiovascular changes the treatment should be on ordinary medical lines.

OCULAR DISTURBANCES

In cases of severe or prolonged toxæmia, especially of the renal type, the ocular fundus should be examined by a specialist. The presence of hæmorrhages, separation of the retina, or of retinitis is a valuable indication for the termination of pregnancy. Ocular changes are much more frequent in nephritis toxæmia, although blindness may be more frequent in the hepatic type. As a rule the ocular symptoms disappear after the termination of the pregnancy in hepatic toxæmia but not to the same extent in kidney lesions. In 30 cases of eclampsia in the Royal Free Hospital only 3 had ocular symptoms. Only one patient was found to be affected out of 65 cases of severe toxæmia without convulsions. In the renal type ophthalmoscopic examination may reveal a very serious condition of affairs which may shorten life within some few months or years of the pregnancy.

ANÆMIA

In hospital practice one is frequently struck with the large number of anæmic women who attend the clinics or come into the wards. Although in this country we have not the profound anæmias which are described by Lucy Wills[21] and also by Green-Armytage[22] as occurring in India, there is a considerable amount of fairly serious anæmia in association with pregnancy. This anæmia is mainly due to vitamin and iron deficiency. Sunlight, fresh air, and a generous mixed diet is essential in the prevention and treatment. Green vegetables such as spinach contain iron. As already mentioned, the fœtal drain on the maternal iron is considerable.

In the antenatal clinics of the hospital we give yeast and massive doses of ammoniated citrate of iron in powder form to a large number of the patients. In the wards each patient receives once a day a routine dose of iron and cod-liver oil. Marmite and cooked liver or liver extract are given to some of our anæmic patients. Our biochemists, Dr. Pillman Williams[24] and Dr. Lucy Wills, investigate and superintend the treatment of this condition. I sometimes question how much absorption takes place in those cases in which massive doses such as 90 grains of Blaud's pills are given daily. Transfusion of blood, as most obstetricians know, is of great benefit in the treatment of severe anæmia, toxæmia, shock, and sepsis.

ANTEPARTUM HÆMORRHAGE

In hæmorrhage occurring most especially in the later weeks of pregnancy and apart from that due to placenta prævia the chief cause is toxæmia, which results in placental changes and separation from the uterine wall. Fœtal death is inevitable if the hæmorrhage is extensive. In my experience this condition has decreased very much of late—a fact which is a testimonial to antenatal supervision. If the placenta has not entirely separated the effect of the toxæmia on the mother is much more marked than when the placenta is free in the uterus. This points to the fœtal and placental origin of the toxæmia, but this condition may be secondary to the deficiency disease of the mother.

In the treatment of antepartum hæmorrhage all depends upon the conditions which determine whether simple rupture of the membranes or Cæsarean hysterectomy is indicated. The more severe the condition the less should be the surgical interference, as the hæmorrhage may be a symptom of a very profound toxæmia involving the liver and kidneys. It must also be remembered that version of the fœtus in breech positions may be followed by hæmorrhage in a toxic patient. I cannot too strongly stress the fact that in my opinion version is a serious operation and should not be undertaken lightly in cases of toxæmia. It not infrequently leads to fœtal death and sometimes to partial separation of the placenta.

In the investigation of 40 consecutive cases of toxic antepartum hæmorrhage in the Royal Free Hospital we found that it occurred more frequently in multiparæ, thus pointing to a renal origin of the condition. The fœtal mortality was high—25 per cent. No maternal deaths occurred, and Cæsarean section was not performed in any of the cases. Only 12 of the cases were near or at term; the earliest case was at the 30th week.

Postpartum hæmorrhage is due in the majority of cases to toxæmia and fatigue and can often be avoided by feeding the patient with light meals during labour and encouraging her to eat barley sugar. Abstaining from touching the uterus during the third stage of labour except when expelling the placenta prevents postpartum hæmorrhage in many cases.

INVESTIGATIONS OF BLOOD AND URINE

In mentioning the assistance we obtain for purposes of diagnosis in the investigation of the blood and urine of a case of toxæmia, I have not the courage to enter into any discussion in regard to the respective merits of the tests which the various biochemists put forward. I agree with Dr. Bethel Solomons [29] that a test is of little value to our limited intelligence as clinicians unless it can be put to some use at the bedside. What does it all narrow down to in the end?

The examination of the blood indicates not only the number of blood corpuscles and percentage of hæmoglobin, but in addition gives us some insight into the function of the kidneys by furnishing a report upon the urea content. This content is normally lowered in pregnancy, especially in the latter half. If the urea content soars to 30 or 40 mg. per cent. we feel there is some cause for watchfulness at least.

In a normal pregnancy a urea content of 22, or slightly over, reassures us that renal function need not be a source of anxiety. If the urea content indicates renal complications we try treatment by rest in bed and dieting, but if this fails the pregnancy may have to be terminated. Uric acid is, however, a finer test of nitrogen retention than urea. The sugar curve of the blood is an indication of the aberrations which take place in carbohydrate metabolism. In cases in which the blood-sugar content is high, insulin may be given with discretion.

Examination of the urine.—Albumin is the danger flag throughout pregnancy. When it persists and is considerable in quantity it indicates renal damage and should never be overlooked. Hence the routine examination of the urine in all cases of pregnancy is a necessity. A considerable amount of albumin in the urine should not be allowed to persist for more than two to three weeks as there is the danger of permanent kidney damage. It is an indication for the termination of the pregnancy (Gibberd [11]).

In regard to the feeding of patients suffering from considerable loss of albumin due to chronic nephritis, there is some diversity of opinion. If the protein loss is excessive the tissues will be drained. In the case of a pregnant patient suffering from this condition there is the added drain from her fœtus. She will, therefore, suffer from protein starvation unless her intake is supplemented by protein. Physicians not infrequently find that patients suffering from nephritis show signs of rapid improvement when a protein diet is provided. The whole question is admirably discussed by Cruickshank.[8] I have found for years that it is desirable to get a patient, suffering from toxæmia, on to a mixed diet as soon as possible. I have had much better results than when I adhered to the rigid rules which practically meant starvation.

The urea-concentration test is useful in determining renal function. The presence of casts is also of value. Bacteriological examination for the colon bacillus by culture of the urine at the bedside as advised by Colebrook [30] I find gives many more positive results than those obtained when the urine, after standing, is sent to the laboratory for culture. An important indication of renal damage is the low specific gravity of the urine. The quantity of urine passed is very important, especially in serious cases of toxæmia. The intake and output of fluid should be carefully measured and compared. Scanty or suppressed urine is a grave sign of toxæmia and may indicate immediate efforts for the termination of the pregnancy. In renal cases suppression is even more serious as it indicates a greater degree of concentration than toxæmia. I have no experience of decapsulation of the kidneys or other similar operations. I see little indication for them but rather the danger from surgical interference in these cases. Hot packs, electric light baths, and diuretics such as citrate of potash are of benefit. Urea may be used with care. Cruickshank advises guaiacum baths—painting the axilla with tincture of guaiacum 10 per cent. in glycerin and applying warm blankets for 20 minutes. Pyelitis rarely requires treatment other than rest in bed, dieting, warmth, and urinary sedatives and antiseptics. A very large number of these cases are sent into our wards for treatment, and in no case has surgical interference been necessary; as a rule, these patients clear up very satisfactorily, and a ketogenic diet is giving good results in some cases. In the study of the blood and urine changes the biochemists give us many tests and deductions which may persist or may change with the fashions. We go on our way thankful for any help in making a diagnosis, but we rely to a great extent upon our own clinical observations and our knowledge of the particular patient concerned.

ECLAMPSIA

This is the most serious form of all toxæmias. It would take a volume to contain the information we are given on the subject. We all treat it by methods of elimination and by sedatives in all their permutations and combinations, but we must remember that the prevention is our aim. Prof. Stroganoff came to London from Russia some years ago to show us how to treat eclampsia and asked us all to give him cases for demonstration. When he visited the Royal Free Hospital I told him we had none at the time and that our practical experience of these cases was getting less and less. He said to me: "I have ome to London to teach you all the treatment of clampsia, but I am returning to Russia having earned how to prevent it.”

Indications for Surgical Treatment

Statistics everywhere seem to be in agreement that the less we interfere with these cases of toxæmia the better, and that the lowest mortality is obtained by conservative methods, but when obstetrical indications require the application of forceps there is, of course, no ban upon their use. Pregnancy in some cases has to be terminated early in order to save the life of the mother or guard her from permanent ill-health. Termination in late pregnancy may be necessary for the same reasons and also perhaps to save the life of the infant.

A list of cases where the induction of therapeutic abortion has taken place in the Obstetrical Unit at the Royal Free Hospital shows the total number in 10 years (1921–31) to have been 52, classified as follows: pulmonary tuberculosis, 25; heart disease, 14; renal disease, 8; miscellaneous, 5. In no case was the uterus emptied because of uncontrollable vomiting.

The best method of terminating an early pregnancy is by hysterotomy which can be combined with sterilisation. The rapid evacuation of the uterus by the cervical canal is dangerous, except in very early pregnancy owing to hæmorrhage and shock. The slow method by tents or a small rubber bag gives better results. Premature labour can be induced by digital stretching of the cervix and by separation of the membranes at the internal os. Rupture of the membranes, or the introduction of a rubber tube or bag, are also to be advised.

There are no rules to be followed except those which are gained by our own experience. A case of nephritis may require induction of abortion or, preferably, abdominal hysterotomy and sterilisation. In some cases we allow the pregnancy to continue, and urge that it must be the last; this is a risky proceeding and requires great supervision, but the results in the chosen cases have been very satisfactory. If the patient has symptoms which do not react to efficient treatment, or the condition is grave and yet not grave enough for the risk of interference, then we confess that we have failed as physicians and must perforce recommend surgical interference. But my rule as in all cases of operations in obstetrics is “when in doubt do nothing.” We must remember that many women’s lives are just saved because we manage to avoid the strain and perhaps trauma of labour until the condition of toxæmia has been improved with treatment.

Cæsarean section has its place for consideration. It is advocated by Miss Basden,[31] who has obtained good results. I have found few indications for its use and avoid it in the treatment of acute toxæmia except in cases where there is a definite obstetrical indication. For example, in our treatment of 65 consecutive cases of grave toxæmia Cæsarean section was not performed in a single case, and there was not a maternal death.

ANÆSTHETICS

These require careful consideration in cases of toxæmia. Gas-and-oxygen is safe; chloroform is a hepatic poison; ether may cause pulmonary complications. If spinal anæsthesia is employed due attention must be given to the state of the blood pressure. If low, spinal anæsthesia is contra-indicated. I would like to give a warning as to the use of pituitrin injections in cases of toxæmia, especially those of renal origin. I have had a case of death from sudden shock and uræmia just after an easy spontaneous delivery in a multipara with renal damage. This occurred after the administration of pituitrin. In several other cases I have noticed the presence of varying degrees of shock after pituitrin injections. It is a method of treatment which cannot be used without considerable discrimination.

Postnatal and Antenatal Care

It is obvious from a study of toxæmia and its effect upon maternal morbidity that a thorough examination should be carried out in every case a few weeks after childbirth and the puerperium. If any complication is found to be present, further supervision and treatment are indicated. The investigations upon renal function show how necessary it is that this function should be tested. For this reason postnatal care is essential for every individual patient no matter how normal her confinement may have been. Every case attended by a midwife should be seen later by a doctor at least once; gynæcological complications would be reduced to a great extent by this means. In some cases it is necessary to forbid any future pregnancy or one before a given date, and for this reason contraceptive advice should be available at the postnatal clinic just as part of the general medical supervision. Separate clinics would not be necessary if every practitioner had a knowledge of contraceptive treatment.

The chief aim of antenatal care is to prevent the development of toxæmia or if it has developed to prevent the onset of serious symptoms such as acidosis or eclamptic convulsions. Most of the toxæmias of pregnancy can be prevented by a suitable mixed diet. Treatment of the condition becomes most effective when diet deficiencies are supplemented. Drugs may have to be given to replace more rapidly the tissue drain.

The Standard of Obstetric Work

In conclusion I would urge that the standard of obstetric work and teaching must be raised throughout the country. Clinics must be staffed by medical practitioners who have had special training in the work but who are not necessarily specialists. These should preferably be responsible for the supervision of the whole management of pregnancy, labour, and the postnatal maternal welfare. The Diploma of the College of Obstetricians and Gynæcologists or that of the Society of Apothecaries or other equivalents should be insisted upon by public health authorities as a qualification for undertaking the duties of an antenatal clinic. Antenatal work should be in the hands of qualified practitioners. Midwives should carry out the instructions of the doctor and should have facilities for immediate help when it is required in childbirth. A panel of practitioners should be available for this purpose and consultants referred to when necessary.

Much criticism is levelled against antenatal supervision, but in reply one has only to compare the midwifery of the present day with that before antenatal examinations came into practice. Craniotomy operations upon the living fœtus are now almost unknown and yet the Cæsarean section-rate has not increased in those clinics where antenatal care has been made a special feature. Accidental hæmorrhage and difficulties with malpresentations are rarely encountered now in the labour ward. In time also we shall gain much more knowledge of the prevention of eclampsia.

The physician who by research and practice lowers the incidence of general diseases such as rickets, scarlet fever, and rheumatism, will do much to aid us in the reduction in the maternal mortality of future generations.

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ASSOCIATION BETWEEN NEUROSYPHILIS AND CARDIOVASCULAR SYPHILIS *

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WHEN I first entered mental hospital work I had expected to find cases of general paralysis of the insane exhibiting no cardiovascular lesions. I was thinking along the old lines that cardiovascular lesions were but tertiary manifestations and due to renewed activity of the spirochæte; whereas general paralytic changes were to be regarded as something entirely different, not due to direct spirochætal activity, and in fact parasyphilitic.

Collier, in arguing against the theory of two varieties of spirochæte, neurotropic and dermotropic, points out that it can no longer be held that tabetics and paretics are free from tertiary lesions. The clinical work to be reviewed brings all the different syphilitic manifestations into line with each other, and demonstrates the absurdity of the theory of two varieties of spirochæte. From a study of the work of Warthin, it seems only rational to expect to find cardiovascular changes in a large proportion of cases showing neurosyphilis. There are people who have weak cardiovascular systems, and who show arterio-sclerotic brain changes in association with heart lesions. When they get syphilitic infection (which we now know to be a widespread infection) they will be the people to show markedly this association between neurosyphilis and cardio-aortitis.

CLINICAL EVIDENCE

In 1930 Bach and Worster-Drought examined 25 clinical cases of neurosyphilis for cardiovascular changes, and 25 clinical cases of cardiovascular syphilis for neurosyphilis. Of 25 cases of neurosyphilis, 7 (28 per cent.) showed cardiovascular changes. Of 25 cases of cardio-aortitis, 4 (16 per cent.) showed some neurosyphilitic changes. Carey Coombs in the same year found that of 103 cases of cardiovascular disease due to syphilis, 26 (25 per cent.) gave evidence of neurosyphilis.

In 1907 Rogge and Müller of Breslau in 22 consecutive cases of tabes dorsalis found 8 (36 per cent.) with definite clinical evidence of syphilitic cardiovascular disease. In 1913 Denke reported on 153 cases of syphilitic aortitis, of which 63 (41 per cent.) showed physical signs of neurosyphilis. In 1923 Frisch published a series of 115 cases of neurosyphilis, of which 9 only (7 per cent.) showed clinical evidence of aneurysm or syphilitic aortitis.

Thus clinically one in seven of neurosyphilitics give evidence of cardiosyphilis. Viewing the relationship from the other standpoint, there is in cardiosyphilis a great variation in the percentage showing neurosyphilis :—

Bach and Worster-Drought	..	16 per cent.
Coombs	..	25 „
Denke	..	41 „
Average percentage ..	..	33 „

Thus, clinically, one in three of cardiosyphilitics give evidence of neurosyphilis.

PATHOLOGICAL EVIDENCE

Frisch, in 1923, in 115 cases of neurosyphilis found pathological evidence of syphilitic aortitis in 45 cases (39 per cent.), Kessler, in 1924, in 59 cases of tabes dorsalis found 39 cases with syphilitic mesaortitis (66 per cent.), Lowenberg in 341 cases of general paralysis found 114 cases with evidence of aortitis at autopsy (33 per cent.). This gives an average percentage of 38 and thus from the pathological evidence more than one in three of neurosyphilitics give evidence of vascular changes.

The difference between the clinical and pathological figures is accounted for in several ways. First, it is difficult to detect the cardiac lesions in life with ordinary methods of examination. These patients do not complain of any cardiac symptoms, and only recently have the newer methods of radiography and electrocardiography been applied to this work. Secondly, the neurosyphilitics are the class with the nervous system more vulnerable than the vascular system. Thirdly, when cases come to autopsy, both nervous and cardiac lesions will be well advanced.

AN INVESTIGATION

I will now give the results of an inquiry into 169 cases (seen at the County Mental Hospital, Chester) which were analysed for the correlations between neurosyphilis and cardiovascular syphilis. These cases, like those given above, have been divided into two groups, the clinical and the pathological.

Clinical evidence.—There are 114 cases in this group, subdivided into the following sections :—

(a) Cases discharged after malarial treatment ..	40
(b) Cases remaining in hospital at end of 1931 ..	33
(c) Cases dying *in the years 1925 to 1931,* but where no post-mortem examination was held..	41

The clinical evidence in these cases is derived from auscultatory findings, blood-pressure records, and radiographic examination. In each case by inspection and palpation an estimate is made of the size of the heart, particularly for left ventricle hypertrophy or dilatation. The aortic sounds are carefully examined. A systolic aortic murmur, loudest at the aortic area and propagated up into the vessels of the neck, is taken as evidence of aortic stenosis. The murmur is usually loud and rough, and often accompanied by an aortic systolic thrill. A diastolic murmur, soft and blowing, transmitted down the left of the sternum, especially if associated with left ventricle enlargement and Corrigan's pulse, is taken as evidence of aortic incompetence. The most common finding is a basal aortic systolic murmur, and an accentuated aortic second sound. Many cases gave the characteristic basal to-and-fro systolic-diastolic murmur.

The blood pressure has been taken in all cases with a baumanometer, in the lying-down position, between 11 A.M. and 12 noon. Both pulses are examined, and in many cases a marked difference has been found between the readings on the two sides. A raised blood pressure with an accentuated aortic second sound in a young man with a positive blood Wassermann is taken as evidence of early syphilitic aortitis.

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* Part of a thesis for the M.D. degree of the University of Birmingham.

The chest has been screened in most of the cases, nd the more interesting cases have been plated. The gns looked for are: slight enlargement of the heart o the left, increase of the aortic shadow to the right, ilatation of the aorta, enlargement of the aortic nuckle, and in some cases obvious aneurysmal ilatation. In assessing each case the findings of the hree special methods of examination are carefully onsidered, and so an accurate picture is obtained of he cardio-aortic state.

Of the cases discharged after malarial treatment, 32 are Chester cases, the other 8 are cases sent from Denbigh Mental Hospital for malarial treatment.

TABLE I.—*Incidence of Cardiovascular Syphilis in cases treated by Malaria*

	G.P.I. cases.	Cardiosyphilis present.
1925	8	4
1926	2	1
1927	4	1
1928	1	0
1929	4	1
1930	3	3
1931	10	6
Denbigh	8	4
	40	20

In this series 50 per cent. of the cases of general paralysis give evidence of cardiovascular syphilis.

TABLE II.—*Cases remaining in the Hospital at the End of 1931*

Admitted.	G.P.I. cases.	Cardiosyphilis present.
1919	1	1
1925	1	0
1926	1	1
1927	6	5
1928	4	3
1929	6	4
1930	2	1
1931	12	6
	33	21

In this series 64 per cent. of the cases of general paralysis give evidence of cardiovascular syphilis.

TABLE III.—*Cases Dying 1925 to 1931, no Post-mortem Examination being Held*

	G.P.I. cases.	Cardiosyphilis present.	
1925	8	6	
1926	9	2	
1927	8	8	
1928	8	4	
1929	3	3	1 case of aneurysm
1930	1	1	
1931	4	3	
	41	27	

In this series 66 per cent. of the cases of general paralysis give evidence of cardiovascular syphilis.

From three groups of cases set out in Tables I.–III. it is seen that 59 per cent. of the general paralytics at Chester give clinical evidence of cardiovascular syphilis. This figure is much higher than any figures yet published. It shows that it is the rule, rather than the exception, for a well-marked case of general paralysis to show evidence of cardiovascular damage.

Pathological evidence.—There are 54 cases in this group of general paralytics, dying in the years 1925 to 1931. In each case a post-mortem examination was held, the heart and great vessels were carefully examined for evidence of syphilitic valvular disease and syphilitic mesaortitis respectively. Sections of the diseased aorta have been examined microscopically in doubtful cases, and in many the spirochæte has been demonstrated. In some cases it has been difficult to decide between senile atheroma and syphilitic aortitis. These doubtful cases have been rejected. Coombs, in his Lumleian lectures in 1930, discussed this difficulty, and his criterions have been adopted.

TABLE IV.—*Autopsies showing Cardiovascular Syphilis*

	G.P.I. cases.	Cases showing cardiosyphilis.	
1925	3	2	
1926	10	4	
1927	8	7	
1928	6	5	
1929	7	7	2 cases of aneurysm
1930	14	10	
1931	6	5	
	54	40	

In this series 74 per cent. of the cases of general paralysis give evidence of cardiovascular syphilis.

The 40 cases showing cardiovascular syphilis were distributed in age-groups as follows:—

Ages—								
28	*30–34*	*35–40*	*41–44*	*45–50*	*51–54*	*56*	*62*	*68*
1	3	4	13	10	6	1	1	1

Thus the biggest proportion of these cases fall into the 40–50 group, that is the fifth decade. It is to be noted that 8 cases occur in men under 40, this being contrary to Kessler's findings. Five cases showed a partial Babinski syndrome, being cases of tabes dorsalis with aortic valvular disease and aortitis.

PREVIOUS TREATMENT

I have made inquiries into the previous treatment, the date of infection, and the latent period. There were three cases where no history was obtainable. Two cases had received no treatment at all, but the latent period was estimated as 5 years and 20 years respectively. Seven cases gave a history of previous mercurial treatment only, and in these cases the latent periods were 12, 14, two at 18, 19, 20, and 30 years respectively. Twenty-eight cases had received early treatment with arsenobenzols. Most of these had acquired their infection during war service and had received one or two courses of "606" but did not persist in treatment. This group of cases is extremely important in connexion with the question of the efficacy of arsenobenzol treatment and the questionnaire sent round by the Medical Society for the Study of Venereal Diseases in 1925 (see Brit. Jour. Ven. Dis., 1925, i., 133). The latent periods of this group of 28 cases are as follows:—

Years—											
4	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*20*
1	1	1	1	3	6	7	3	2	1	1	1

It is to be noted in this group that more than half of the cases have a latent period of 9 to 12 years, whereas in the group having had mercurial treatment the shortest latent period is 12 years. It thus seems that a short course of "606" predisposes to early and intense nervous and cardiac lesions. The two cases with 20-year and 15-year latent periods had received prolonged "606" treatment in America. Apparently the most dangerous treatment of early syphilis is a short course of "606," giving as it does great security at that time but intense morbidity in the space of 9 to 12 years.

DISCUSSION

The figures obtained in the series of cases examined at the Chester Mental Hospital show a much higher percentage of cardiovascular syphilis in cases of neurosyphilis than any yet published. They are higher even than those of the German clinics. It must be remembered that the cases of general paralysis sent to a mental hospital are very advanced in their disease, and hence such a close correlation between neurosyphilis and cardiosyphilis is to be expected. The general conclusion to be drawn is that syphilis affects the whole body more commonly than is supposed; it supports the contention of Warthin that spirochætes will be found in every organ of the body in a syphilitic. It also supports the view that general paralysis is an active syphilitic infection, and not a parasyphilitic process.

The incidence of cardiovascular syphilis in association with neurosyphilis and mental disease is of immense importance from the point of view of treatment by induced malaria. In the early years of this treatment many cases died suddenly during or just after their pyrexial course, and no clinical evidence of aortic disease had been found. I have seen such cases at the Chester Mental Hospital, and similar findings have been noted by Bach and Worster-Drought, Gerstmann, Rudolf, and Lowenberg. The correlation between the two kinds of syphilitic disease, cardiac and nervous, is really closer than had been thought. It was taught that the clinical diagnosis of the nervous lesions was predominantly in the fourth decade and that of the cardiac lesions in the fifth decade, but in mental hospital work the two kinds of disease occur together in the fourth and fifth decades. Which lesion will be noted first depends partly on the severity of the separate lesions and also on the relative sensitivity of the two systems in the one individual. Thus the make-up of the patient from both the physical and mental angles determines this issue. Ernest Jones has demonstrated that certain people have undue sensitivity of their internal organs, and if this state is very well marked, hypochondriacal symptoms will result. These psychasthenic people, when infected with syphilis, complain of the lesions according to the more sensitive system, and thus the diagnosis is determined to a cardiac or a nervous state. In general one would expect an earlier outcry on the part of the nervous system, as it shows a more sensitive reaction to disease.

With reference to the age of incidence of the two types of disease, and the period after initial infection, there are some differences of opinion. Kessler said in 1924 that cases of neurosyphilis under 40 years of age did not show aortic disease. I have referred to eight cases showing well-marked aortic disease with neurosyphilis under the age of 40 years. Stokes stated that it was rare to find the cardiovascular system affected by syphilis in the first decade after initial infection, that only 45 per cent. were diagnosed in the second decade, and that 55 per cent. occur in the third decade or later. In my series I have found cases of fulminating general paralysis with pronounced cardiovascular changes within a decade of the initial infection. This is an important point when discussing the early treatment of syphilis, as it is certain that the service men who had short courses of arsenobenzol treatment relapsed sooner than men infected in the early years of this century and treated with long courses of mercury. Coombs found the latent period in his series of cardiac cases to be 22·7 years, and Bruce found it to be 25 years. In my series I have differentiated between the cases having arsenobenzol and mercurial treatment, showing that the latent period averages about ten years with the former and twenty years with the latter. It is surely no accident that there is so close an association between the two sets of syphilitic phenomena, the cardiac and the nervous. The disease must have evolved in the same way in the two areas, and the only differences noted will be differences of function, depending on the relative weaknesses of the two systems in the individual concerned. Males predominate in all the series of cases published either of nervous or cardiac disease, Coombs showing that 90 per cent. of his cases were males. Again, even in congenital syphilitic disease the heart and the brain lesions fall into the same epoch, but the latent period is a little shorter.

It now remains to inquire if there is any fundamental explanation of this very close association between the cardiac and the nervous lesions. Warthin's paper on the lesions of latent syphilis shows that, once a person is infected with the spirochæte, foci of latent infection remain in all the organs for the rest of the patient's life. Thus it is not really surprising that, when activity is renewed, disease arises in both heart and brain; the wonder is that many other organs are not acutely affected in addition. There is, however, evidence that other organs do show active disease at a late stage, and in association with nervous and cardiac lesions. Bruce found diabetes mellitus, presumably of syphilitic origin, to be a frequent accompaniment of syphilitic disease of the circulatory organs. Marañon saw it 23 times in 140 cases of aortic syphilis. On the other hand, Coombs had not seen one such case. Bostock described a case in 1926, and I have in my series a very interesting case beginning as diabetes, then suffering from aneurysm, and finally dying of specific meningo-encephalitis, the spirochæte being found in all three lesions.

Now the infection must linger in some parts of the body and, after lying latent for a number of years, come into action again and acutely affect various areas. It has been suggested by Coombs that the lymph glands of the body are the sites of latency. Martland contributes to the view that the mediastinal lymph glands harbour the spirochætes in the latent period. Stern has proved a lymphogenous origin for tabes dorsalis, and it is very probable that both the aortic lesions and tabes dorsalis come from the same reservoir of infection, that is, the mediastinal lymph glands. This explains the occurrence of the Babinski syndrome, either in the complete form of tabes dorsalis with aneurysm or the less complete form of tabo-paresis with aortic incompetence. Lymphadenitis is a prominent feature of secondary syphilis and appears to mark the end of the bacteræmic stage. Presumably this is as true of the internal glands which are hidden from examination as it is of the external glands which are obvious and palpable. Experimental work has demonstrated the persistence of living spirochætes in the lymphatic glands for months or years after an animal has been inoculated with the disease. Moreover, Engmann and Eberson have demonstrated in three cases out of fourteen of general paralysis that the lymph glands contain spirochætes. It is thus very likely that the spirochætal infection lies latent in the main lymph glands, and at the end of the incubation period for the cardiac and nervous lesions, for some reason at present unknown, the infection flares up again and attacks the vital organs. We know that the posterior cervical glands are markedly affected in secondary syphilis, and I suggest that the spirochætes, lying latent in these glands, ascend into the spinal canal and cranial cavity and so cause syphilis of the spinal cord and brain. There is thus much scope for further research on this interesting problem of the late infection of the central nervous system in syphilis.

CONCLUSIONS

1. Cardiovascular syphilitic lesions are the rule rather than the exception in cases of so-called general paralysis. It is found that clinically 50 to 60 per cent. of so-called paralytics give evidence of cardio-aortic lesions, and that 74 per cent. of the autopsies of paralytics give the same evidence.

2. The latent period after short courses of "606" averages 9–12 years, whereas the latent period after mercury treatment averages 12–20 years. It is certain that early treatment of syphilis with inadequate doses of salvarsan is dangerous.

3. Many of the cases of general paralysis referred to in this paper acquired their infection while on war service and received short courses of "606." Within ten years these cases relapsed badly with cardiac and nervous syphilis. This evidence forms an alarming answer to the questionnaire formulated by the Medical Society for the Study of Venereal Diseases in 1925.

I thank the medical superintendent, Dr. G. H. Grills, for permission to publish the figures and cases referred to in this paper.

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THE PENTNUCLEOTIDE TREATMENT OF AGRANULOCYTIC ANGINA *

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IN her studies on living human blood-cells, Sabin [1] suggested that the stimulus for the production of non-motile polymorphonuclear cells might be products liberated from disintegrating homologous cells.

This led to a study of the leucocyte-stimulating properties of nucleic acid and nucleinates. Doan, Zerfas, Warren, and Ames [2] injected relatively large doses of sodium nucleinate intravenously into rabbits. They found that, after a preliminary decrease of leucocytes, a considerable leucocytosis followed. Their experiments pointed to the spleen as being responsible for the preliminary leucopenia, as after splenectomy this did not occur. Jackson [3] had meanwhile demonstrated the presence of pentose nucleotides in normal human blood. Doan [4] gave intravenous injections of pentose nucleotides into rabbits. He found not only a peripheral leucocytosis, but also a marked myeloid hyperplasia of the tibial bone-marrow. Repeated injections caused neither exhaustion nor malignant change in the myelopoietic elements, and after cessation of the injections the blood gradually returned to its former state.

C. Reich and E. Reich [5] have reported experiments on the Pentnucleotide treatment of rats, either young rats which are normally leucopenic, or those rendered leucopenic by previous treatment with benzol. Their results were uniformly negative, but they admit that benzol poisoning may not provide conditions comparable with human agranulocytosis. R. F. Phillips (unpublished) has recently tested for the Therapeutic Trials Committee the effect of pentnucleotide in rats made leucopenic by irradiation. No significant change was produced in the leucocyte counts of these animals, and the treated rats survived no longer than the corresponding controls.

In the human subject the syndrome of agranulocytic angina described by Schultz [6] presents a very constant picture. It commences with rapid onset of vague symptoms of lassitude. Then follows a general prostration accompanied by a rapidly spreading lesion in the mouth, both being characterised by a severity out of all proportion to the pathogenicity of the organisms found in the lesions. Examination of the blood reveals a complete, or almost complete, absence of polymorphonuclear leucocytes.

This is undoubtedly a rare condition, but since the original description several cases have been described and their treatment with pentnucleotide recorded. Jackson, Parker, and Taylor [7] reported a series of 69 cases collected from various sources, of which 74 per cent. recovered after pentnucleotide treatment. Cases treated with pentnucleotide have also been reported in this country by Bulmer,[8] Fairley and Scott,[9] and Marriott [10]; of these, two recovered, the case of Fairley and Scott being fatal.

In man the response takes the form of a steady increase of granulocytes. Jackson noted that this began as a rule on the fifth day after the commencement of treatment; but Doan's cases showed an immediate rise. Doan [4] also drew attention to the fact that the myelocytes showed a marked increase at the beginning of treatment, falling off again as the polymorphonuclear cells returned towards normal levels. This myelocytic response somewhat resembles the reticulocyte response in pernicious anæmia. The preliminary leucopenia noted by Doan in his experiments on rabbits has not been observed in the human cases so far recorded.

Last year the Therapeutic Trials Committee of the Medical Research Council accepted an application for clinical trials of pentnucleotide, and one of us (J. F. W.) was asked to coöperate in the tests of this product on the committee's behalf. The application to the committee was made by Messrs. Menley and James Ltd., agents in this country for the Smith, Kline and French Laboratories of Philadelphia, who manufacture pentnucleotide. In view of the rarity of cases of true agranulocytic angina (for which condition pentnucleotide is specially recommended), it has been felt justifiable to publish this single case as a preliminary report to the Committee.

CASE RECORD

A housewife, aged 34, was admitted to hospital on March 13th, 1934. Fifteen months previously she had had a severe attack of diphtheria. After her return home

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* A Report to the Therapeutic Trials Committee of the Medical Research Council.

occurred pari passu with the fall in the leucocyte count.

A daily reticulocyte count provided significant information concerning the functional activity of the erythroblastic marrow. From an initial percentage of 3·8 the reticulocytes steadily diminished in numbers and, as indicated in Table II., the percentage on the day of death had fallen to 0·6. From those figures it may be concluded that immediately prior to death a condition of almost complete marrow aplasia existed. The depressed state of the marrow in the last week of the illness was such that no response was obtained either from blood transfusion or from intramuscular injections of nuclein. Although only two such injections were given, there is no reason to suppose that a granulocytic recovery could have occurred at this stage of the disease.

On reviewing the case as a whole it appears that the leucopenic state induced by the *B. typhosus* infection was associated with a markedly inadequate response on the part of the patient's immunity mechanism, if one may take the agglutinating titre of the serum as a criterion of the magnitude of the immunity response. The titre of the serum was estimated on several occasions and, as already indicated, never rose higher than 1 in 250. With the immunity mechanism depressed the septic anginal condition readily developed and the superadded toxæmia induced not only an agranulocytic state but a generalised inhibition of marrow function.

It is now recognised that in addition to idiopathic agranulocytosis first described by Schultz [2] in 1922 secondary agranulocytosis is met with in a variety of conditions. Thus Fried and Dameshek [3] claim to have produced leucopenia with granulopenia in experimental animals with strains of *B. suipestifer* isolated from human beings, and in rare instances an agranulocytic state has developed after injections of *B. typhosus* vaccine. The present case may be interpreted therefore as a secondary agranulocytosis complicating typhoid fever.

I wish to express my thanks to Dr. A. P. Martin, medical superintendent of the Salisbury Hospital, for kindly allowing me to investigate this case.

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THE FATE OF FOLLICULAR HORMONE IN THE LIVING BODY

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The following is a brief report of experiments dealing with the fate of œstrogenic hormone (folliculin œstrin) in the living body. A comprehensive paper in the *Skand. Arch. f. Physiologie* will deal with the literature and experimental technique.

After the oral or subcutaneous administration of folliculin only very small quantities are excreted in human or animal urine in an active state. In the case of a woman of 49 who had received during a period of 15 days 54 mg. = 540,000 mouse units of folliculin (α-hormone), I was able to discover only 1·6 mg. = 16,000 m.u. (i.e., 3 per cent.) in the urine. A sexually mature man who received a single subcutaneous dose of 40,000 m.u. excreted less than 5 per cent. during a period of ten days. The excretion in the case of rats is still less. Even after the injection of 20,000 m.u., which is a very big dose for a rat, no folliculin is excreted in the urine. What becomes of the hormone inside the body? Does it get stored up in the organs, or is it inactivated or destroyed? For the investigation of these questions infantile rats which had been given folliculin subcutaneously were analysed *in toto*. The animals were well minced and for this purpose the hide as well as any excreta (urine and fæces) that had been passed in the meantime were included. The resulting tissue pulp was subjected to exhaustive extraction by means of organic solvents. This produced the astonishing result that already three hours after the injection of folliculin (α-hormone) only very small quantities thereof could be demonstrated in the animal. On the introduction of 40,000 m.u., which is a very large dose for an infantile rat, only about 1 per cent. of the hormone was rediscovered in the total animal 72 hours after injection. So that 24 hours after the introduction of folliculin only traces can be rediscovered in the animal and this at a period when the biological effect of the hormone on the uterus and vagina is not yet visible.

From this it appears that α-hormone does not become stored up in the body, at all events not in an active state. Further experiments showed that α-hormone gets inactivated in the body. It was possible by hydrolysis to reactivate a part of the inactivated folliculin, the yield being, after 24 hours, 20 per cent. instead of 1 per cent. and, after 48 hours, 6 per cent. instead of 1 per cent. The fact that reactivation is possible in larger quantities at the end of 24 hours than at the end of 48 hours suggests that during the period that inactivation is taking place various bodies are produced which are capable of reactivation by hydrolysis in differing degrees. Reactivation is, however, only partially possible (maximum 20 per cent.). Whether the remaining 80 per cent. are so transformed by the body that they cannot be regenerated by our chemical methods (hydrolysis) or whether the body destroys any excess of hormone introduced cannot be said. Inactivation of α-hormone occurs apparently in the liver by means of enzymes. It does not take place in other organs nor in the blood. The experiments showed that folliculin becomes fixed by adsorption to the cell-wall in varying degrees, the adsorption being most intensive in the case of striped muscle.

In contradistinction to α-hormone, hormone benzoate is not inactivated in the body. From this there follows the supposition that the inactivating process attacks that part of the hormone molecule which in the case of hormone benzoate becomes saturated as a result of esterification with benzoic acid.

Folliculin is inactivated not only by warm-blooded animals, but also by cold-blooded animals and plants. Inactivation in cold-blooded animals (frog) is less than in warm-blooded animals (rat), being only 80 per cent. in the former and over 95 per cent. in the latter. In the hyacinth inactivation occurs in the root, as H. v. Euler and I have recently shown. Folliculin does not become inactivated by means of yeast.

I am indebted to Dr. Bernard Homa for the translation of this paper.

THORACOSCOPY BY SINGLE PUNCTURE

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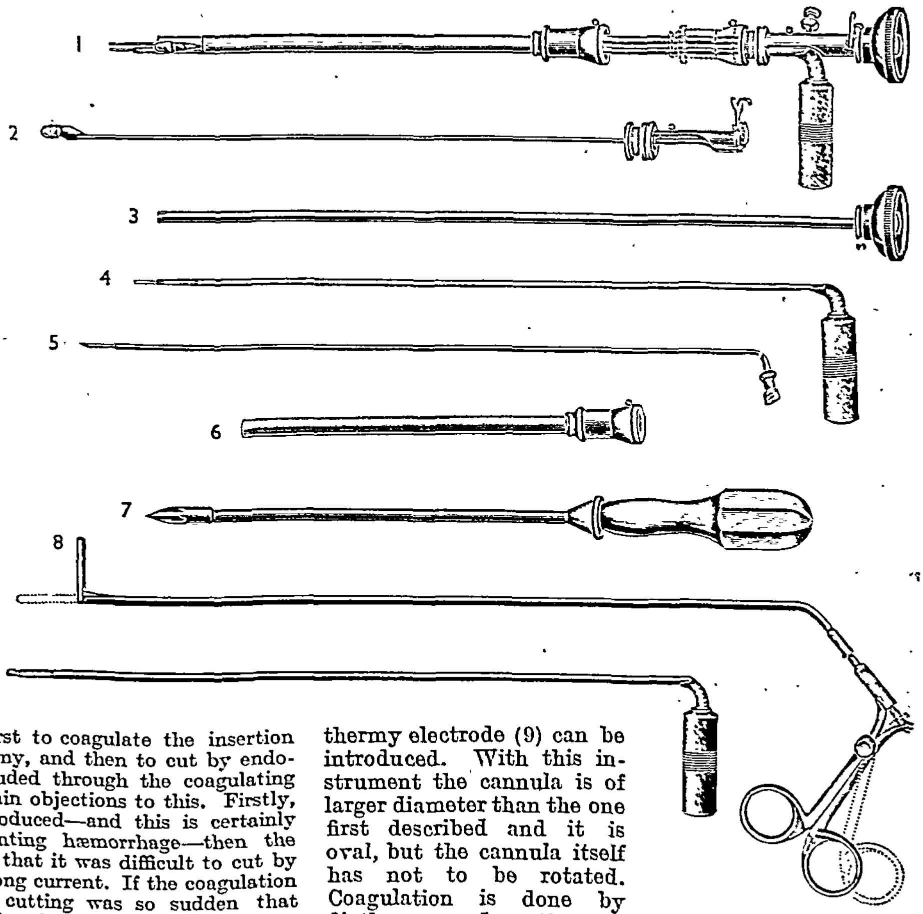
Experience has shown that a large proportion of pleural adhesions, perhaps the majority, can be severed by the single-puncture method of thoracoscopy. If it can be done safely there is every advantage in avoiding the extra trauma involved in the two-cannula method—the risk of surgical emphysema is lessened and by a nervous patient the avoidance of the extra pricks of the local anæsthetic needle will be appreciated. I am not maintaining that this technique is always better than the two-cannula method—in fact, with the latter there is more mobility; if a small artery should spurt it is easier to get the lamp and the end of the telescope out of the way of the blood and so keep the bleeding point in view. Interchange of telescope and electrode is possible, thus more adhesions may become accessible at the one operation. In some cases I am sure that to have separate entry for light and operating instruments is essential, and with this method the technique of G. Maurer, of Davos, is probably the best and safest. With the right-angle telescope a much larger area of the pleural cavity can be brought successively into view, and it is possible to see round the edges of the adhesion. But whatever instrument or method is employed a right-angle telescope is an essential adjunct, and I invariably use it for a preliminary survey and not infrequently during the course of the operation.

The first instrument I described[1] employed a 30° telescope and was designed first to coagulate the insertion of the adhesion by diathermy, and then to cut by endothermy with a wire protruded through the coagulating electrode. There were certain objections to this. Firstly, if over-coagulation was produced—and this is certainly the safest way of preventing hæmorrhage—then the resistance became so great that it was difficult to cut by diathermy, even with a strong current. If the coagulation was not so complete the cutting was so sudden that hæmorrhage might be produced, and also the cut might be so fine that the adhesion failed to gape, and consequently coagulation of the deeper parts was rendered difficult and uncertain. The illumination was not very good. Moreover, to anæsthetise the pleural attachment of the adhesion or its neighbourhood it was necessary first to pass a direct vision telescope alongside which was passed the anæsthetising needle. This meant more instruments and the passing and withdrawing of various instruments. To obviate this Mr. R. Schranz, of the Genito-Urinary Manufacturing Company, made for me two very fine insulated rods which could be inserted alongside the telescope, one for diathermy coagulation and cutting, the other for electrocautery. These acted well, but the electrodes were naturally flimsy and bendable. I felt there was not sufficient control of bleeding, and the different instruments had to be passed in one at a time, which meant frequent changing and manipulation.

THE IMPROVED PATTERN

The instrument I now use has developed from the experience gained over the last five or six years. With it I have divided without hæmorrhage, without special difficulty, and without serious reaction, not only easy cord and band adhesions but wide adhesions 2½ inches in width and more, and of a thickness in parts up to ½ inch, and also series of adhesions. It has proved itself highly efficient. It is strong, the field of vision is wide, the illumination brilliant. The electrode carrier (4) is rigid, the electrode itself strong and not easily bent, and is of sufficient size to prevent and control bleeding. Should this occur, however, or if the adhesion is very vascular, or large vessels are encountered, a larger ball-shaped diathermy electrode (9) can be introduced. With this instrument the cannula is of larger diameter than the one first described and it is oval, but the cannula itself has not to be rotated. Coagulation is done by diathermy and cutting by electrocautery. Cutting can be done by endothermy if desired. The two currents are carried by the same electrode, which is a platinum-iridium loop. The currents are controlled by a bi-pedal footswitch. All the instruments required are ready for use in the cannula—needle, telescope, and electrode. Therefore, local anæsthetisation in the pleural cavity and cutting can be done without moving any of the instruments. The electrode can



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[1] The Lancet, 1930, i., 232.

be removed and replaced by a Maurer's hook (8). The advantages of the instrument are the complete control allowed over the operative procedure, the steadiness and rigidity, the assemblage of practically all essential instruments together so that everything required is to hand at the one spot, and lastly ease of handling. There is no doubt that the single-puncture method is much easier than the two-cannula method, and to those who have only occasional use for thoracoscopy this must be a great advantage. For one thing the considerable difficulty of orientation is eliminated. It is true that after sufficient practice orientation and the "picking up" of instruments and objects becomes almost automatic, nevertheless it is obvious that some find the difficulty quite appreciable, and others may not be able to get sufficient practice.

At the moment the 30° purely diathermy instrument has been abandoned. To cut by endothermy is undoubtedly the quickest method, but after considerable experience I have come to the conclusion that it is safer to pursue the slower method of coagulating by diathermy and cutting by the electrocautery. Of course, endothermy cutting can be done with a coarser electrode, but the danger of hæmorrhage is not entirely eliminated.

With a single-puncture instrument accurate localisation is absolutely essential. After comparing stereoscopic pictures and the original method of rotating the patient described in your columns [2] I have come to the conclusion that the rotating method is by far the best. Dr. J. V. Sparks has given me the greatest assistance in this respect, and it is very rarely that the localisation beforehand and the selection of the optimum point of entry by trial on a skeleton have proved misleading. It is the usual experience to come straight upon the adhesion from the desired direction. If, for any reason, this is not so, then a second cannula can be inserted, either for the telescope or the operating instrument.

As in the one previously described, every part of this present instrument can be sterilised by boiling.

The new thoracoscope for single puncture (as may be seen from the illustration) can aptly be described as a bundle of rods (1) held together by an oval tube—the cannula (6). The nucleus is the lamp carrier, a metal cylinder with a central hole, and two lateral longitudinal grooves, to which a thin but firm metal tube is soldered carrying the lamp at the distal end (2). At the junction of the tube and metal cylinder is the cable connexion, which encircles the whole. Grouped round this lamp carrier, and engaging at the proximal end in the grooves cut for the purpose, are the telescope (3), the diathermy galvanocautery (4), and the hypodermic needle (5). The telescope only can be fixed to the lamp carrier, so that the relative position of the objective and the lamp remains constant. The cautery and the needle, on the other hand, can be advanced $1\frac{1}{2}$ inches beyond the objective.

The simultaneous introduction of all these instruments is obviously impossible, the calibre of the cannula would be much too large to be practical. In order to overcome this difficulty the telescope, cautery, and hypodermic needle are assembled round the lamp carrier in such a way that their distal end reaches only half-way between the lamp a
proximal end, and are held together in this
by a clip. The lamp, which occupies nea
whole lumen of the cannul introduc
and after emergence at th the rem
components are advanced. l is ov
cross-section and just large d the rod
components in close proxim p, wh
the pleural cavity, lies reall bundle
rods.

As already mentioned the telescope is locked to the lamp carrier when in position. The cautery and needle, when not required, hold by friction on the metal cylinder of the lamp carrier, and are out of view in this position. The instruments are of sufficient length to provide ample movement in the pleural cavity without moving the cannula. The drawback of having to rotate an oval cannula in the limited intercostal space is obviated by the direct vision telescope. The angular aperture of the telescope has been pushed to its furthest limits. The visual field is such that a good survey of the pleural cavity can be carried out.

The illumination is entirely novel. It is provided by a lamp which concentrates all the available light over an area roughly equal to the field of vision. The corresponding gain in clarity and definition is very noticeable. The combined galvanocautery and diathermy electrode is a rigid rod, the core of which is composed of two conductors insulated one from the other, carrying the low-tension current which brings the cautery point to a red heat.

In addition to the relatively thin insulation required for the low voltage, an insulating sheath of sufficient thickness to withstand high-frequency currents surrounds the two conductors. The instrument can therefore serve the triple purpose of bipolar galvanocautery, and monopolar diathermy electrode, or endothermy cutting electrode. The hypodermic needle is fitted with a record mount and bayonet catch to which a suitable syringe (5 c.cm.) is attached.

In practice it soon became apparent that this method of cutting adhesions complicated the wiring problem—i.e., the various connexions from the transformer and diathermy apparatus. To eliminate this drawback the endo-diathermy apparatus formerly described has been fitted into a slightly larger cabinet, and separate cautery and light transformers built in. The apparatus was thereby transformed into a distributing centre of the three circuits required for operation with one main cable feeding all three. All controls and terminals are situated in the panel on the apparatus. The cautery and endo-diathermy circuits are interconnected and controlled by a selector footswitch. As one or other pedal is pressed, so the cautery will function as galvanocautery (red heat) or diathermy electrode. The light circuit is independent of these two and permanently connected to the main via a separate earth-free transformer.

The apparatus can be wheeled into a convenient position near the operating table, and the two bipolar cables for light and diathermy galvanocautery attached to the towels with a clip, and do not drag or hamper the operator.

LIVERPOOL ROYAL INFIRMARY: ANNUAL REPORT. The report for 1933 records that it is many years since this hospital has been able to show both a reduction of expenditure and a credit balance. Since, however, the
ordinary income was £46,941, and the ordinary expendi-
£49,621, there would have been a substantial loss
the y orking but for the use for general main-
of free legacies amounting to £5895.
urses' home has been paid off, but a
be needed to complete it. Last year
in-patients—a large increase—who
reduction of one day; there were
. Receipts from private wards
mpleted year, and it is proposed

.. 1930, ii

THE LYSIS OF PNEUMOCOCCI BY SODIUM DESOXYCHOLATE

EFFECT OF VARYING CONCENTRATIONS OF SODIUM CHLORIDE

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ASSISTANT PHYSICIAN TO THE HOSPITAL

The experiments reported here were suggested by the observation that high concentrations of potassium phosphate added to broth cultures of pneumococci facilitated the lysis of the organisms by sodium desoxycholate.

The favourable effect of magnesium sulphate on the lysis of pneumococci by bile-salts has been reported by Nicolle and Adil-Bey (1907). According to Falk and Yang (1926) the chlorides of monovalent cations (Na, K, NH_4, Li) in relatively low concentrations (0·004–1·0 per cent.) inhibit dissolution of washed pneumococci by bile, but in higher concentrations (2·0 and 4·0 per cent.) these chlorides may accelerate the dissolution of the bacteria. In Falk and Yang's experiments the chlorides of divalent cations Ca and Ba inhibited the lysis of pneumococci by bile more effectively in high than in low concentrations. Their experiments were limited in that they used only one concentration of bile with varying concentrations of electrolyte.

In the present communication the effect of varying amounts of sodium chloride and sodium desoxycholate on the lysis of washed pneumococci is described.

EXPERIMENTAL

The organism, a strain of pneumococcus Type I., was grown in veal broth prepared according to the method described in a previous paper (Hart and Anderson, 1933). The well-grown but not autolysed culture was centrifuged and the cells washed twice with M/20 phosphate buffer pH 7·0 and suspended in this buffer solution. The deposit obtained from 200 c.cm. of culture was suspended in 40 c.cm. of buffer. The bacterial suspension was measured into test-tubes (6×⅝ in.) in amounts of 1 c.cm., and water and solutions of sodium chloride and sodium desoxycholate (B.D.H.) were added in that order, the final volume being 2·4 c.cm. The tubes were shaken and immediately placed in a water-bath at 35° C. for 60 minutes. The final concentration of sodium chloride varied from 0 to 15 per cent., and of sodium desoxycholate from 1 in 800 to 1 in 60,000. After an hour in the water-bath the tubes were observed and the minimum concentration of sodium desoxycholate that gave a water-clear solution was noted for each concentration of sodium chloride.

When the minimum concentration of sodium desoxycholate in milligrammes per 100 c.cm. is plotted against the concentration of sodium chloride in grammes per 100 c.cm. a curve such as that shown in the Figure is obtained. The curve given, which represents the combined results of two experiments, is in the form of a rectangular hyperbola. It will be seen that there is a reciprocal relationship between the concentration of sodium chloride and the concentration of sodium desoxycholate required to produce lysis. When the amount of sodium chloride is small an increase of one or two grammes per 100 c.cm. in its final concentration produces a relatively large increase in the sensitivity of the system to desoxycholate. When the final concentration of sodium chloride is above 5 per cent. any further increase produces very little increase in sensitivity, and even in the highest concentrations of salt some desoxycholate was required to produce lysis. It should be noted that the solutions that contained no chloride contained other electrolytes, in the shape of sodium and potassium phosphates, provided by the buffer solution. These electrolytes produced some increase in sensitivity, as was shown by other experiments in which distilled water was used for washing and suspending the bacterial cells. It was found that the desoxycholate would still lyse the cells in the absence of sodium chloride, but that higher concentrations were required than when the cells were suspended in buffer.

In the method described above the readings were made at 60 minutes. In another experiment, in which readings were also made at 30 minutes, comparison of tubes containing the same amount of desoxycholate showed that the rate of lysis was increased by raising the final concentration of sodium chloride. For example, in a tube containing sodium desoxycholate in a concentration of 33 mg. per 100 c.cm. and sodium chloride 0·4 per cent. lysis was only partial at 30 minutes but complete at 60 minutes, while in another tube, containing the same amount of desoxycholate and 1·0 per cent. sodium chloride, lysis was complete in 30 minutes.

These results are not in agreement with the conclusions of Falk and Yang that sodium chloride in low concentrations inhibits the lysis of washed pneumococci by bile. But this difference is possibly due to the use, in our experiments, of pure sodium desoxycholate, instead of bile, as the lytic agent.

The effect of sodium chloride on the lysis of pneumococci by sodium desoxycholate may be compared with the work of Yeager (1929) on hæmolysis. He found that the resistance of red cells to lysis by sodium taurocholate was inversely proportional to the concentration of sodium chloride when the latter varied from 0·85 per cent. downwards, the isotonicity of the solutions being maintained by appropriate additions of sucrose.

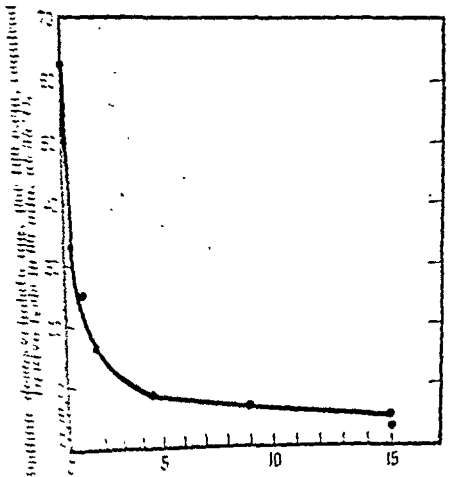
TREATMENT OF EMPYEMA WITH BILE-SALTS

A number of papers have appeared recently on the treatment of pneumococcal empyema by the injection of bile-salts into the abscess cavity after aspiration of the pus. Cocchi (1931), Schwartz (1932), and Thomson (1933) used sodium taurocholate, whilst Sworn and Cooper (1934) used sodium desoxycholate. The results described above suggest that this treatment might be more efficacious if the pneumococci in the empyema cavity were exposed to a relatively high concentration of sodium chloride at the time of introduction of the lytic agent. It would seem best in practice to aspirate the pus, wash out with hypertonic saline, leaving a hundred or more cubic centimetres in the cavity, and then immediately to inject the sodium desoxycholate dissolved in a small volume of water.

Apart from the question of their toxic effects, the quantities of sodium desoxycholate and sodium chloride that can be used are limited by the solubility of the bile-salt in solutions of the chloride. For example, whereas 100 c.cm. of 5 per cent. sodium chloride will dissolve 5·0 g. or more of sodium desoxycholate, the same volume of 7·5 per cent. sodium chloride will only dissolve 0·1–0·15 g. of the desoxycholate. If, therefore, the final concentration of sodium chloride, after washing out the empyema cavity, were greater than 5 per cent., the quantity of sodium desoxycholate that could be injected for each hundred cubic centimetres of fluid remaining would be necessarily restricted. With a concentration of 5 per cent. or less the limit of solubility would not be reached.

The total dose of sodium desoxycholate used by Sworn and Cooper for each injection was 0·25–1·0 g., but our in-vitro experiments suggest that a considerably smaller dose would be effective even if the contents of the cavity at the time of the injection amounted to several hundred cubic centimetres, provided that the concentration of sodium chloride were at least 1·5 per cent. (see Figure).

It should be made clear that the method outlined here has not so far been applied by us in treating cases of pneumococcal empyema. While therefore suggestions are made as to the range of final concentrations of sodium chloride to be aimed at in the chest cavity, the actual figure must at first be chosen [illegible] particularly if the pleura is considered [illegible] thickened, in order to avoid any [illegible] or other irritative effect due to the [illegible] electrolytic content of the saline [illegible].



[illegible] sodium chloride on the lysis of washed pneumococci by sodium desoxycholate.

SUMMARY

[illegible] was found to increase the [illegible] washed pneumococci to lysis by [illegible], there being a reciprocal [illegible] the concentrations of these two [illegible] to produce dissolution of the [illegible] suggested that the augmentation [illegible] sodium desoxycholate by sodium [illegible] in the treatment of pneumo- [illegible] results.

[illegible] Prof. C. C. Okell, in whose [illegible] carried out, and to Dr. F. C. [illegible] The work was carried out [illegible] (A. R. A.) of a part- [illegible] Research Council.

it have been recorded. Prosser White,[1] in his exhaustive book on the occupational diseases of the skin mentions several observers who have recorded linseed dermatitis. One of them, Vokoun, investigated the subject in the United States, and indicates that linseed dermatitis is not uncommon in factories where the oil is expressed.[2] In one series quoted by Vokoun it would seem that it was not the linseed but the burlap bags in which it was packed which caused the dermatitis. Kooperman, quoted by Vokoun, thinks that it is not the oil but the dust from the seed, both ground and seed, which causes the dermatitis, and in a footnote Prosser White states that from the description given by Vokoun in one of his publications it might be due to the dust and not the oil. The following instance which recently came under my observation may be of interest.

The patient, aged 28, is regularly employed in discharging cargo from ships, usually unloading grain but occasionally handling other cargoes. He has been so employed for about 12 years and has not had any previous skin trouble as the result of his work. On Feb. 15th and 16th he discharged barley, on the 17th and 19th linseed, and on the 20th maize. The linseed is already packed in bags and he carries these ashore, but has to fill the other substances into bags before taking them ashore. On the evening of Feb. 19th he noticed slight itching on the back of the neck. The following day the whole of the neck was inflamed, and on the 21st the eyes became swollen and redness appeared in front of both elbows. He attended the Royal Infirmary on this day. The eyes were swollen, there was redness over both ears, while over an area sharply demarcated under the jaw and chin and extending laterally out towards the acromion process on each side and downwards both in front and behind like an old-fashioned lace collar, there was a marked dermatitis venenata. In front of each elbow there was a diamond-shaped area of redness but no vesiculation. A few days later the dermatitis reached from the shoulder to the wrist on each side though the original areas in the antecubital fossæ were much better, as was also the dermatitis on the face and neck.

On March 7th, when the acute stage had entirely passed off, he was tested with maize and linseed to discover which was responsible. Some uncrushed maize seeds were applied dry as a patch test while others were moistened before being applied. Patch tests were made with linseed in the same way. Nothing was seen on March 8th, but on the 9th there was a marked positive reaction where the wet linseed had been applied. Coincident with the appearance of the reaction there was a definite focal reaction, the dermatitis at the original sites on the neck and in front of the elbows showing a marked exacerbation. This gradually subsided as the original condition had done.

This case would suggest that the dust from the seeds and not the oil was responsible for the dermatitis. According to Vokoun, the Indian seed is more irritating than the other varieties. A member of the ~urance company dealing with the man's claim inquiries and elicited the information which was being unloaded

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[illegible] 1926, xxxviii., 1. Jour.

[1] [illegible] Affections of the Skin, [illegible]

[2] [illegible] 1927, lxxix., 20.

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REVIEWS AND NOTICES OF BOOKS

Green's Manual of Pathology

Fifteenth edition. Revised by H. W. C. VINES, M.A., M.D., Pathologist to Charing Cross Hospital, London. London: Baillière, Tindall and Cox. 1934. Pp. 928. 25s.

BROUGHT out first more than sixty years ago, and with a new edition on the average every four years, "Green's Pathology" has enabled countless medical students to meet the needs of the qualifying examiner. It was not, and is not, intended for research workers or for post-graduate study in pathology; the aim of successive editors has been to give the student some insight into the processes of disease. The present edition has been largely rewritten by Dr. Vines, who has added many new illustrations and replaced many of the old ones by photographs. Additional chapters have been introduced dealing with avitaminosis, diseases of the ductless glands, the generative tract, and the breast. The original arrangement of the work into two parts, one dealing with general principles, the other with the special pathology of organs, has been retained, but in other respects the order has been considerably altered by the present editor. For the most part these will help the student, but we have a misgiving about dealing with inflammation before the degenerations. It seems to us more rational to dispose of the purely retrogressive changes in pathology before attacking the progressive ones; teachers are aware that retrogressive cell changes are on the whole more easily demonstrated histologically to the beginner than the somewhat complicated cytology of inflammation.

There may be just a doubt whether the book has not now reached, or indeed somewhat overpassed, the limits of the medical student's capacity. There is perhaps a tendency in this edition to strive unduly after comprehensiveness and to lose balance by so doing. Hitherto the student has been guided in the direction of the fundamentally important sections by finding these dealt with at greater length than the others. Teachers may well differ on the relative importance of subjects, but silicosis, which is described incidentally in various parts of the book and briefly under lung diseases, might have been given a section to itself. Chronic nephritis, the importance of which to medicine cannot be denied, has hardly been given due weight, and Russell's classification, however valuable as a contribution to pathology, is not the clearest way of imparting to the student an idea of the sequence of events in the nephritic process. In dealing with pulmonary embolism no mention is made of the possible origin of emboli in the leg veins, which is regrettable when so much depends on drawing the student's attention to the dangers of post-operative swelling of the leg.

In its present form the manual will find, and deserve to find many new friends.

Morality and Reality

By E. GRAHAM HOWE, M.B., B.S., D.P.M., Associate Physician, Institute of Medical Psychology. London: Gerald Howe. 1934. Pp. 136. 6s.

THIS little book, which the author puts forward as "An Essay on the Law of Life," is made up of five lectures delivered for the Home and School Council; consequently the style is familiar, though not always easy. The book presents conclusions about the widest relations of human beings to the world, reached by the author in the course of his work as a psychotherapist. Morality and the nature of things have engaged the lifelong attention of the greatest thinkers, and some may hold that the production of an essay with such an ambitious title is an over-bold excursion into the realms of philosophy. But the polished systems of trained moralists are for many readers less likely to be of interest than the struggles towards a *Weltanschauung* of an individual whose training is that of a doctor and whose daily work is the treatment of neurotics. His contact with the problems of what is right and what is real in the world almost demands that he should form a working system for *himself*. Dr. Howe's system is now somewhat remote from its beginnings and basis; it has religious and mystical features and is presented here in a form in which its derivation from medical practice is no longer evident. This doubtless accounts for the difficulty and the occasional obscurity of his language, which is, however, lightened by a vigorous use of odd illustrations and original words—e.g., "oughty" and "escapologist," and by some diverting symbolical diagrams. In the first lecture the Good and the True are considered in relation to the Law, in the second Law and the Child, in the third Law and the Family; Law and the Social Group, and the Fulfilment of the Law are the titles of the concluding lectures. The book as a whole shows in an illuminating way the tendencies inherent in the theory that underlies much present-day analytical psychotherapy.

Early Forerunners of Man

A Morphological Study of the Evolutionary Origin of the Primates. By W. E. LE GROS CLARK, D.Sc., F.R.C.S., Professor Elect of Anatomy, University of Oxford; Professor in the University of London. London: Baillière, Tindall and Cox. 1934. Pp. 296. 15s.

IN this book Dr. Le Gros Clark brings together the anatomical evidence bearing on the vexed questions of anthropoid ancestry, for the justification of the main title lies in the inclusion of man in this group of the order of primates and not in any consideration of him as a species. It is a well-written work of very great interest, in which the author considers the relative positions of the groups with which he is dealing from the combined points of view obtained by reference to several anatomical systems. Skull, teeth, limbs, brain, special senses, digestive and reproductive systems are all examined with this idea in mind. His researches lead him definitely to certain conclusions, which appear to be reasonably based on the available evidence. The positions of the tarsioid and lemuroid groups are important questions; Prof. Le Gros Clark is decidedly of the opinion that the protolemuroids must have branched off from the less specialised line at a very early stage, so that it is probably not legitimate to speak of a "lemuroid" phase in the development history of the anthropoidea. He seems also very certain that the tarsioids did not linger much longer in the generalised line, since their structural specialisation appeared very early. He comes, in fact, to agreement with Hans Gadow's proposal to place tarsius in a central sub-order of the primates, with no connexion beyond a remote ancestral one with the anthropoids. There is a most interesting chapter on the tree-shrews, which the author would seem disposed to place among the primates—a sort of remnant from the time when protolemuroids and prototarsioids were separating from each other. The book is full of interesting detail, put simply and clearly. It brings out very well the parallelisms which obtain in the evolutionary history of the primates, as in other orders, characters which are referred for explanation to the principles of orthogenesis; this, however, is not pushed to its logical conclusion. Driven by the nature of his material, Prof. Le Gros Clark deals largely in assumptions, but these are kept in accordance with facts.

Each reader, doubtless, will have his own views on the many questions of evolution, but whatever these are he will derive both pleasure and profit from a study of this volume.

Applied Physiology

Fifth edition. By SAMSON WRIGHT, M.D., F.R.C.P., John Astor Professor of Physiology, University of London, Middlesex Hospital Medical School. London: Humphrey Milford, Oxford University Press. 1934. Pp. 604. 18s.

THE teaching of physiology has lately suffered from the criticism, applied also to other subjects in the medical curriculum, that the student is made to learn a great deal which is of "no use" to him in his future work. This arises from a false sense of values which Prof. Wright's book should go some way to correct. Here numerous facts of physiology are presented, reference being continually made to their application in medicine and surgery; anyone engaged in clinical study or teaching might be pardoned for regarding it as the perfect text-book of physiology. It is up to date, and contains many facts difficult to find elsewhere; if the student knew everything in these 600 pages he would know more than sufficient from the point of view of immediate utility. Yet this is emphatically not the book for the student reading for his second professional examination. It is too often forgotten that he comes from his pre-medical courses knowing virtually nothing about the body; in the short period of 18 months or so he has to learn a completely new language so thoroughly that in his subsequent work he thinks in terms of nothing else. This volume assumes a working knowledge of the language which it is the primary task of the physiologist and anatomist to teach, and the time when it should be added to the bookshelf is just before or just after the second examination. The student is now possessed of the necessary fundamental knowledge, and his critical faculties have been awakened; he requires orientation. Strictly speaking, "applied physiology" is medicine or surgery or midwifery, but Prof. Wright has gone far to create a new transitional subject, and his book is alike valuable in introducing a new point of view and in serving later for reference.

Its unsuitability for the uncritical reader is indicated on the fly-leaf where there is a quotation from the Book of Proverbs: "The simple believeth every word; but the prudent man looketh well to his going." The long list in the preface of subjects which have been revised indicates not only that the matter has been conscientiously brought up to date, but that nothing in the text must be taken as the final word. The book is written—no doubt in the interests of clarity—in a rather dogmatic fashion, the matter being presented where possible in tabular form. There is no harm in this for the reader so long as he does not mistake crisp style for certain knowledge. Controversial subjects are avoided or provisionally prejudged, and there is little discussion of the pros and cons of experimental evidence; this is compensated by introducing in successive editions the most recent work in all parts of the subject, and by the gain in continuity. The treatment of the nervous system is excellent; the anatomical tradition is broken, and the approach made physiological. This might well serve as a pattern for all text-books of physiology.

The fact that this book has run into five editions in a comparatively short time is in itself eloquent testimony to the place it has taken in medical education. Its general appearance is attractive, the illustrations are numerous and often original, the index is full and supplemented by cross-references in the text.

Coccidia and Coccidiosis

Of Domesticated Game and Laboratory Animals and of Man.

By ELERY R. BECKER, D.Sc., Associate Professor of Protozoology, Iowa State College. Iowa: Collegiate Press, Inc. 1934. Pp. 147.

COCCIDIOSIS has, during recent years, attracted considerable attention, chiefly on account of its bearing on the successful rearing of domestic animals. As a result there has accumulated much valuable information, which is, however, difficult of access since it is scattered in innumerable journals. Intensive study has revealed an unexpected multiplicity of species in some animals—for instance, in the fowl the two species previously recognised have now been extended to six. Similar results have been obtained with other animals such as cattle, sheep, and pigs, and it is becoming clear that each host has its own group of coccidia, which are highly specific in that they are unable to infect any other kind of animal. Each species is not only morphologically, but also immunologically and pathologically distinct, so that a fowl, for instance, would have to suffer from six separate infections if it were to become entirely immune to coccidiosis. Attempts have been made without success to discover drugs which will overcome coccidial infections or prevent them, while efforts have been made by careful hygienic measures to rear animals entirely free from contamination. It has been found, however, that as a rule the best results from the practical point of view of breeding are obtained by allowing a mild infection in the very young animals, a procedure which produces an immunity to what might be a more serious infection later in life. It is fortunate that coccidiosis in man is relatively rare, while the parasites of many animals are merely of zoological interest. This book is very complete, describing all the known species, lists of which, together with their hosts, are given in appendices. Each parasite is considered, so far as existing knowledge permits, from the various points of view noted above, special stress being laid on the effect on the hosts and the lesions produced. There is a sufficiency of good illustrations and a very useful list of references to literature.

The book should be in the hands of all those who are interested in the subject of coccidiosis, whether from the purely zoological point of view or that of the intelligent animal breeder.

THE LANCET

LONDON: SATURDAY, AUGUST 18, 1934

THE DEATH PENALTY AND THE PUBLIC

THE issue of a new journal, the *Penal Reformer*,[1] is fresh evidence of the feeling of many citizens that hanging is an obsolete and unjustifiable punishment. Its abandonment, they hold, should not be postponed till the advent of some general revision of criminal justice and prison administration; and in this they can point to the recommendation of the Select Committee on Capital Punishment which in 1930 advocated abolition of the death penalty for an experimental period of five years. It was unfortunate that, owing to dissensions and abstentions, the Select Committee's report was to some extent discounted as a one-sided statement, since apart from its conclusions it was valuable for its considered summary of the case for and against. Whether the true theory of punishment be the vindictive doctrine of the *lex talionis*, or the principle of atonement, or the security of society, or simply the reformation of the offender, well-known arguments against the gallows can be based on the sanctity of human life, the non-deterrent effect of hanging, the fallibility of human decisions, and the failure to offer reformative opportunity to murderers who are not necessarily hardened criminals. The abolitionists, however, are not all agreed on a practical policy. Dr. MAURICE HAMBLIN SMITH, whose long experience as a prison medical officer entitled him to speak with special authority, told the Select Committee that he deprecated treating the question as separate from other changes in the penal system. His broad view of the administration of justice led him towards the position that all crime was a disease and that offenders should be dealt with by boards containing psychological experts, though not exclusively medical in their membership. Mr. ALEXANDER PATERSON, one of the Prison Commissioners, a witness whose humane outlook no one would venture to attack, suggested that there should be a reduction in the number of executions—a sort of de-facto abolition which would prepare a conservatively minded public for legal abolition. Obviously, however, he was dissatisfied with the alternatives to hanging. Indeed, he declared that he regarded a sentence of imprisonment for more than ten years as less humane than the death-penalty.

It may well be said that we are moving towards some such system of de-facto abolition as Mr. PATERSON advised; and on the long-term view there are notable stages of progress. It has been estimated that 2000 people were executed annually for criminal offences in the reign of Henry VIII. and 400 in that of Elizabeth. In the ten years from 1920, on the other hand, the average number of capital sentences carried out was 14, and the latest available return (for 1932) shows that of 10 persons convicted of murder, 4 were executed and 6 had their sentence commuted to penal servitude for life. The prerogative of mercy, in fact, mitigates the severity and finality of the criminal law. The *Penal Reformer* is able, nevertheless, to print a depressing list of persons hanged since last November, while its summaries of the defences proffered might even suggest that there was room for doubt about the guilt of some of the executed. As to the risk of such a miscarriage of justice, Dr. HAMBLIN SMITH told the Select Committee that he did not see how, regard being paid to human fallibility, more care could be taken than the law takes at present. He would not entirely exclude the possibility; yet he added the hard saying that, if capital punishment is deemed desirable for other reasons, he would not allow the prospect of judicial error to weigh against it: "if you really thought it was the best form of deterrent, then I would not allow the possibility of the occasional execution of an innocent man to stand in the way." He thought, as others think, that it is the certainty rather than the gravity of the punishment which deters. The reformers, however, are not prepared to concede that, in the case of murder, the hand of the intending criminal is stayed by any deliberate study of the penal clauses of our criminal code. In their view the experience of other countries shows that the death penalty can be abolished without danger.

Death, we shall all agree, is the simplest solution of the problem of the criminal and from his own point of view is sometimes no doubt the happiest. But there are many other people whose advantage and disadvantage must also be borne in mind. Apart altogether from friends and relatives, or prospective criminals, there is the public at large. The form of execution which is used is calculated to inspire horror; and this horror is nowadays so fully exploited by the press that half the population has its emotions roused by dwelling on the murderer's ordeal. If, as we are assured, little more than 30 people have been executed since the Select Committee reported in 1930 one can only say that the newspapers have made these few executions go a very long way. There seems to be an almost continuous performance of the familiar sequence: the scene in court at the sentence; the protestations of innocence: the collapse of wives and children; the pathetic letters; the petition; the refusal of a reprieve; the last reported emotions; the hanging (at breakfast time); the unpleasantly excited crowd waiting for the notice at the prison gates; and the posters ("So-and-so Executed") in every street. Times have changed, it is true, since a hundred years ago when the first railway excursion was run in England—to see a double hanging. Indeed to most of our own generation such an outing would seem indecent, just as it would seem indecent to open slaughter-houses as places of public amusement. But the fact remains that the sufferings of murderers and their families are still used for public entertainment, and the sadistic element which is to be found in everyone, normal or abnormal, is regularly exploited in this way, in the name of the State and for the sake of large circulations.

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[1] Published quarterly by the Howard League for Penal Reform and the National Council for the Abolition of the Death Penalty, from Parliament Mansions, Victoria-street, London, S.W.1. 3d.

ECLAMPSIA AND ANTENATAL CARE

ROUTINE antenatal care was first advocated by J. W. BALLANTYNE of Edinburgh. It is more than 40 years since his "Attempts towards a System of Antenatal Pathology" began to appear, and on this his scheme of care was to be based. Discussion (reported on p. 379) at the recent annual meeting of the British Medical Association indicates that the system of antenatal pathology is still far from complete, and that many of the good results which BALLANTYNE anticipated from his system of care have not been achieved. He looked for a fall in the maternal death-rate from sepsis, hæmorrhage, and embolism, and expected earlier treatment of toxæmia, syphilis, and heart disease. But though some of these hopes have been fulfilled, the maternal death-rate has remained stationary. There are limits, of course, to what antenatal care can do; as Prof. F. J. BROWNE has pointed out in our columns,[1] it cannot be expected to influence the death-rate from post-partum hæmorrhage or from shock after easy uncomplicated labour. The number of deaths from obstructed labour due to disproportion might fairly be expected to diminish, and indeed they are becoming rarer, but he thinks that in many cases the diagnosis of disproportion has led to unwarrantable interference: "It does not help a woman very much if she is rescued from the hypothetical consequences of an abnormality, and is killed in effecting the rescue." In these cases, he thinks, antenatal supervision has simply transferred the mortality from one column to another. A serious criticism of the present system of antenatal care is to be found in our failure to reduce the death-rate from toxæmia. True the rate has decreased in the past two years from 0·69 to 0·58 per 1000, but, as Prof. BROWNE remarked at the B.M.A. discussion, considering that eclampsia is almost entirely a preventable disease, the incidence and death-rate are still far too high. Dr. ETHEL CASSIE presented the findings at a Birmingham maternity home where the standard of antenatal care is exceptional; out of a series of 1000 consecutive cases, 26 per cent. were admitted for the antenatal treatment of conditions such as heart disease, pyelitis, and toxæmia, yet the mortality-rate was only 1 per 1000. In New Zealand the figures are still more remarkable. It is well known how high has been the maternal mortality of childbirth in that Dominion of recent years, and yet among the first 1000 deliveries since the establishment at Otago of a whole-time chair of obstetrics (with antenatal clinic) not a single mother died.[2] This indicates, Dr. CASSIE considers, that where the standard of antenatal care is satisfactory maternal mortality is reduced. To detect toxæmia in its early stages supervision must be close and continuous. Dr. CASSIE contrasted the findings at this maternity home with the results of an inquiry into the maternal deaths in the whole of Birmingham during the past five years; of 88 patients dying of toxæmia, 64 had too little antenatal care or none at all. Attendances at antenatal clinics are increasing, but many of the patients attend only once or twice. Dr. G. F. BUCHAN suggested that when a mother failed to keep her appointment an inquiry should be made at once at her home; she might have failed to attend because of a physical condition calling for immediate treatment. This is not always easy to arrange, as Dr. CASSIE explained; if the patient is not amenable the midwife cannot give effective supervision. Nevertheless, regular antenatal care is essential if early signs of toxæmia are to be detected.

One of the earliest indications of the pre-eclamptic state is a rise of blood pressure, yet this is a sign which the midwife of to-day does not know how to observe. It is Prof. BROWNE's hope that the midwife of the future will be trained to estimate the blood pressure, and that public health authorities will provide her with a simple apparatus for the purpose. It is not difficult to take a blood-pressure reading; the difficulties in the way, formidable no doubt, are of a purely administrative kind. Another early sign of toxæmia was mentioned by Dame LOUISE MCILROY in her Ingleby lecture, published in our last issue. She quotes the work of DAVIS, HARDING and VAN WYCK, BINGHAM, and others, showing that a sudden gain in weight in the latter part of pregnancy is significant of water retention in the tissues, and is an earlier clinical sign of toxæmia than œdema. The normal gain in weight during pregnancy is between 16 and 20 lb.; heavy women gain more than light. As a rough rule, it may be said that if a heavy woman is gaining more than 2 lb. a month, "latent dropsy" should be suspected, and she should be carefully watched. The increase of weight in BINGHAM's cases preceded not only the appearance of albumin in the urine, but the rise of blood pressure, so that this constitutes a valuable sign which anyone engaged in antenatal work can observe. Weekly weighing should be a routine measure.

Notification of eclampsia would possibly lead to earlier discovery, as Prof. BROWNE suggests. Certainly fuller records of every case, as advocated by Dr. BUCHAN, would lead to a better evaluation of the known facts. A hopeful promise of prevention is offered in Prof. MCILROY's concluding lecture, which appears on p. 345. She recommends for pregnant women the diet proposed by Mrs. MELLANBY, consisting of milk 1–2 pints, green vegetables once or twice daily, 1–2 eggs daily, sea fish—for the iodine content—at least twice weekly, and calf's liver once a week. For the rest the patient can choose her own diet, provided she does not over-eat. Prof. MCILROY's statement, "that most of the toxæmia of pregnancy can be prevented by a suitable mixed diet," is instructive. In mothers who are gaining excessive weight restriction of the diet is beneficial. Heartburn, Prof. McIlroy finds, is sometimes an indication of impending toxæmia, and is relieved by giving small dry meals with a low fat content. Hypertension, which is frequently present in toxæmia of the renal type, usually reacts quickly to treatment of the general condition, but she does not advise specific attempts to reduce the blood pressure by means of drugs. Hypertension probably has a protective function, though we look upon it as a warning sign. A sudden reduction of blood pressure by the use of drugs may precipitate heart failure.

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[1] THE LANCET, 1932, ii., 3.

[2] Report by Prof. J. B. Dawson. Dunedin: Crown Print. 1934.

THE SIGNIFICANCE OF GLYCOSURIA IN LIFE ASSURANCE

A DISCUSSION was held recently by members of the Insurance Medical Society upon the importance which should be attached to glycosuria and blood-sugar curves in relation to the duration of life. The speakers debated mainly the policy to be adopted by life assurance offices towards applicants who manifest these symptoms, and the discussion illustrated well the changes which have taken place comparatively lately in medical knowledge, while indicating also the difficulties which remain to be overcome. Dr. BATTY SHAW, who opened the discussion, said that in the past cases of glycosuria had been shunned by life assurance companies, but that recently a change of opinion had occurred. Some companies would accept healthy patients with occasional glycosuria at normal rates, while others rated them up. If the glycosuria occurred intermittently most of the cases were rated up, and cases in which glycosuria was always present were usually rejected. This policy he held to be in error, for his own figures showed that out of 865 accepted cases in which glycosuria had occurred intermittently before acceptance, 49 had died, and only seven of them from diabetes mellitus. In many cases the patients had been rated up because of the glycosuria. Mr. N. J. CARTER had stated that the Eagle Insurance Company had accepted a certain number of cases of glycosuria since 1917, and, while there had been 30 deaths from diabetes among the insured subjects since this time, only one of these had had glycosuria at the time of his original examination, and he had been accepted as a known diabetic; and, further, no patient with mild glycosuria without symptoms of diabetes had died of diabetes in the last 17 years. Figures given by Dr. THEODORE THOMPSON from the Royal Insurance Society were equally striking, as between 1908 and 1933 no deaths occurred from diabetes in cases where there was a personal history of glycosuria.

It has been known since the work of KLEMPERER in 1896 that glycosuria might occur even when the blood-sugar was normal. The observations were made on isolated blood-sugar estimations, as it was not realised until the work of JACOBSEN in 1913 that the blood-sugar increased after a carbohydrate meal. In 1915 GRAHAM, working on two of GARROD's cases, showed that the blood-sugar was always within normal limits although sugar was present in the urine to the extent of 4 per cent., and 20 g. of glucose were excreted in the 24 hours when an ordinary diet was taken. In the last 19 years the existence of a renal glycosuria has been fully established by numerous workers. The amount of sugar excreted may be quite small 1–5 g., or large, 10–30 g.; it may only be present after meals, or it may be present in every specimen. The amount of sugar depends on whether the threshold of the kidney is only slightly lowered, say to 150 mg. per 100 c.cm., or is lower than 80 mg. per 100 c.cm. The sugar-tolerance test, which has made the recognition of this syndrome possible, has been closely studied and the results are sometimes difficult to interpret. During the debate, EMBLEDON, CAMMIDGE, HIMSWORTH, LANGDON BROWN, H. W. COLLIER, PARKES WEBER, and GRAHAM discussed the difficulties which might be encountered and the mistakes which must be avoided in order to give a sound opinion on a sugar-tolerance curve. It was agreed that it is essential that the kind of blood which is used for the estimation should be stated. Capillary blood gives figures which may be 25, 50, or over 70 mg. higher than the venous blood, at the peak of the curve. The quotations from a paper by Dr. RABINOWITCH, read by Dr. COLLIER, lose much of their significance when it is realised that he worked with venous blood. The method used in the estimation of the blood-sugar should also be stated, as the Folin and Wu method gives figures which are 20 mg., on average, greater than those obtained with the Hagedorn-Jensen and MacLean methods. The patient's diet must also be considered. If the patient has either been starved or received a low carbohydrate diet, sufficient to produce a ketosis, the blood-sugar curve may be higher than usual and suggest that the patient has a low sugar tolerance. If the test is repeated after a high carbohydrate diet has been taken for a few days the curve may be quite normal. The majority of workers agree that the fasting blood-sugar should be less than 100 to 120 mg. per 100 c.cm. and should have returned to 120 mg. within two, or some say three, hours. The actual height of the peak seems to be immaterial, provided that the blood-sugar is below 120 mg. in the two hours. This is best instanced by the curve called by MACLEAN the "lag curve," or by SPENCE the "steeple curve." Abnormal curves may be caused by disturbing factors, and Dr. BATTY SHAW gave instances where an overdose of thyroid extract or a subacute attack of cholecystitis had caused curves which would be interpreted as being due to a definite diminution of sugar tolerance. It is wrong to test the sugar tolerance of a patient when he is suffering from any disease, as the disease may cause a glycosuria. The best-known instance of this is the glycosuria which may occur when a bad carbuncle is present; in these cases the sugar tolerance may be quite normal when the carbuncle is healed. However, there still remain some curves which are difficult to interpret, and one way of settling the matter is to use the method which GRAHAM used in confirming the diagnosis in his first cases of renal glycosuria. This method is well described by LEYTON in his book, "Diabetes Mellitus," recently reviewed in our columns[1]; it consists in giving the patient increasing amounts of carbohydrate to eat and seeing how much sugar is excreted.

Those who have worked on sugar-tolerance curves believe that patients with a renal glycosuria or with a typical lag curve should be accepted at the usual rates, provided there are no other contra-indications; the patients with doubtful curves may have to be re-examined in three months' time, and if the curve is then normal should be accepted at normal rates. They believe that it is unwise to accept a patient who has glycosuria unless a sugar-tolerance curve is first obtained, because some patients with mild true diabetes may have no symptoms for a little while after the onset of the glycosuria. Some of the insurance societies, however, find that patients dislike having to undergo a special test, and Dr. OTTO MAY suggested that as patients with occasional glycosuria rarely died of diabetes they might be accepted at normal rates or with only slight rating. He suggested as a working rule, "(*a*) occasional intermittent glycosuria and no symptoms—accept with slight extra; (*b*) persistent glycosuria and no symptoms—a moderate extra; (*c*) frank diabetes, i.e., glycosuria with symptoms—reject or a very large extra." This policy might suit the insurance societies but it would be unfair to the patients with renal glycosuria, who would fall under class (*b*) and would pay a moderate extra rate. The early cases of diabetes which are detected by the sugar-tolerance curve would pass undetected and only pay a moderate additional rate whereas they should pay a heavy rate.

The discussion was of great importance in showing the value of the sugar-tolerance test and also the care which must be taken in any biochemical test in order to prevent misleading reports. It is to be hoped that the insurance societies will continue to use them instead of reverting to rule-of-thumb methods.

PREVENTION[2]

A VOLUME setting out the principles of prophylaxis appears this week, being the second in the post-graduate series issued by THE LANCET. The work is composed of a series of lectures delivered at King's College Hospital Medical School, where the dean and the director of medical studies, by instituting the course, show themselves to have appreciated in a practical manner the growing feeling that the preventive aspects of medicine do not receive the attention that they should, while in educational curricula the importance attributed to them compares sadly with that which is given to clinical work. Sir GEORGE NEWMAN in the first chapter of the book expands his already expressed opinion that the doctrines of prevention should permeate the whole of the student's preparation, and points out that in the revision of medical training, now receiving the attention of the General Medical Council, the preventive side of medical work must be brought forward in a more emphatic manner than hitherto.

It is of the first importance that the mind of the student should be focused throughout his educational career upon the doctrines of prevention—in other words, that he should see from the beginning that it is the duty of the doctor to help his patients to maintain health as well as to regain it. But it will be recognised that all doctors, when faced with facts in their professional careers, act with this view fully before them; they have obtained hitherto from the public little endorsement of such a view. The patient comes to the doctor when he is ill, and often not until the time has gone by when relief from his troubles could have been obtained promptly, or—which is more vital—when permanent recovery could be established. To tell him that if he had lived a different life he might have escaped his present ordeal is felt to be an aggravation of his troubles, and counsel on the matter has been proffered only when a recurrence of the troubles might be expected. But to-day the situation is altered quite distinctly. The sick man himself may not, at any rate while he is suffering, reflect with any particular interest upon questions of prophylaxis, but the circle around him will do it for him and sometimes vociferously. For of recent time the public is aroused to knowing that much of the disease which persecutes us is preventable, and the doctor who can assist in this wholesome awakening finds his words welcome. And his ready audience will typify the modern attitude of all intelligent people. There is with us now a general demand for codes of healthy living, which if the doctor is not prepared to supply, the public will seek from sources less reliable. The first step to meet the demand must be to demonstrate to the sceptic among doctors that there are facts about preventive medicine which are established, and which cover—even when unsupported theories and fads are rigidly excluded—a considerable area of ground of which a map should prove useful. It is true that most, if not all, of these facts are individually familiar to the doctor, but it is not until they are collected that their cumulative weight becomes evident.

The authorities at King's College Hospital were fortunate in securing the excellent coöperation exhibited in this volume; the information afforded by persons of responsibility will enable the doctor to educate his environment on questions of vital hygienic importance. As is said in the preface of the book, the map of prophylaxis, which its pages form, "makes no pretence to be complete, but since each region is surveyed by a recognised authority, often by the original explorer, a vivid outline of the charted country is supplied." The survey shows what effective progress has been made in many directions which enable the doctor to exercise intelligent anticipation of evils to come, and to solve for the public understanding many of the doubts that exist as to the methods of conducting a healthy life.

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[1] THE LANCET, July 21st, p. 141.

[2] A series of lectures on the Preventive Aspects of Medicine. Published by THE LANCET LTD., 7, Adam-street, Adelphi, London, W.C.2. 10*s*. 6*d*.

ANNOTATIONS

THE COD-LIVER OIL TREATMENT OF WOUNDS

Two years ago at a surgical congress in Magdeburg, Prof. Wilhelm Löhr reported on the value of crude cod-liver oil in the healing of wounds. Applied to ulcers, burns, in fact any kind of abraded surface, followed by immobilisation of the part with a plaster bandage, the results were then very striking, and his subsequent experience at the Altstadt Hospital has only been more remarkable. Before he came to Magdeburg Löhr was a biologist, and it was as a biologist that he was first impressed with the effect of cod-liver oil given internally on the healing of wounds in children. He began to apply the crude oil to granulating surfaces, and noted the changes which went on underneath it. He was already aware that, like other oils, cod-liver oil is practically sterile and has some bactericidal action on the common pyogenic organisms. The oil proving too mobile for use alone he combined it with some indifferent fat to make an application of the right consistence,[1] which was found rapidly to permeate granulation tissue forming an emulsion with its secretion. Under this layer he discovered that bacterial growth was hindered and bacterial toxins rendered harmless. The practical result of applying this cod-liver oil salve to a mass of granulations is to change a pale oozing surface covered with detritus into the clean ruddy picture of healing. Tremendous activity with massive secretion of pus soon leads to the shedding of dead tissue and sharp demarcation between the healthy and dead. So violent is this action that it may be inadvisable at this stage to shut it in with an impenetrable layer of plaster, although this should be done as soon as it is safe to do so. On the other hand, the comparatively bacteria-free wounds of industry, common enough in the iron industry at Magdeburg, can safely be covered at once with a layer of oil and immobilised in a plaster bandage, when in this warm chamber healing of the almost sterile wound proceeds at an amazing speed. Any part in which the circulation is relatively deficient, as in chronic ulcers of the leg, can be treated with the occlusive bandage at once. The time of its application is regulated by the acuteness of the infection. Phlegmons and abscesses must first be laid open with the knife; in whitlows and infections of tendon and bone the opportunity must first be given for removal of the dead fragments. But in recent injuries of the fingers and burns of the second degree the immediate application of the occlusive oil bandage results in rapid healing without need of transplantation of skin. During the last three and a half years in the Altstadt no burnt surface has been sown with transplants, even though the epithelium has been destroyed over a surface as large as the back, and one doubts whether such success has attended any other method. Amputation stumps and the open wounds left after removal of a breast cancer with the diathermic knife are equally suited for the treatment, which can also be applied to dirty brain wounds and accidental bed-sores.

An additional claim for the treatment is that it is practically painless, and anyone who accompanies Löhr on a round through the wards can satisfy himself that this is the case. On the other hand there is a drawback which he does not seek to evade, and that is the aroma arising from wounds on which the dressing is left unchanged for days or weeks. The smell will be not unfamiliar in kind, if not in degree, to those who have followed Winnett Orr of Nebraska in treating compound fractures and other septic wounds of bone with a similarly occlusive dressing.[2] This may be unavoidable if, as Löhr believes, the physical properties of an oil are an important element, but it must make medical and nursing work in such wards a trial for those with sensitive noses. Remarkable success is claimed in acute osteomyelitis, which Löhr treats with free incision down to the periosteum combined with drilling or chiselling of the bone. The whole wound is then filled up with the cod-liver oil salve, the edges being brought loosely together with two or three stitches. No drain of any kind is inserted, the oil serving to keep the wound open until it has healed from the bottom. The first plaster bandage is left on for a fortnight and as a rule no sequester is then found. It remains to be seen whether the results are better than those of the Winnett-Orr method, of which painlessness is also a feature[3]; in the meantime they are such as to command respect and lead to imitation. Those who cannot see them for themselves will find a series of admirable pictures in recent published papers.[4]

X RAY TREATMENT OF ACTINOMYCOSIS

ACTINOMYCOSIS may be treated with iodides, by surgery, by irradiation, or by a combination of methods. Some form of surgery is often required; it may be no more than aspiration to establish the diagnosis or it may be an extensive and even mutilating operation undertaken in hope of extirpating the disease. The results of such operations are often highly unsatisfactory and the question arises how far X rays may be effective as an adjuvant or an alternative. Although much success has been reported with irradiation, its use is complicated by the fact that actinomycosis, if it is to be cured, requires a dose that approaches the maximum that the skin will tolerate. The problem has been to evolve a technique which will give certain cure without too much damage. The results are much more hopeful in cases of infection of the head and neck—e.g., jaw, face, tonsil, cervical glands—than in actinomycosis of lungs, liver, or intestine. R. Stewart Harrison,[5] in describing the various methods available, offers his own experience of two of them. The "saturation" method consists in giving a very large initial dose, approaching the maximum possible, and following this by two or three very much smaller ones at intervals of, say, two or three days each. H. Holfelder (whom he quotes) has reported 100 per cent. successes with this technique. In the

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[1] The salve has been put on the market by Heyl & Co., Berlin, under the name "Unguentolan."

[2] THE LANCET, 1933, ii., 357.

[3] Ibid., 1934, i., 530.

[4] Illustrating Burns: Der Chirurg., 1934, vi., 263. Injuries of Hand and Foot: ibid., 1934, vi., 5. Gas Œdema: Arch. f. klin. Chir., 1934, clxxix., 312.

[5] Brit. Jour. Radiol., 1934, vii., 98.

"disjuncted fractional" method, approximately the same dose is given, but in fractions with intervals between doses of one week to a month, so that the whole course may last six months. Harrison adopted this in 14 cases of actinomycosis of the head and neck that came under his care, and the results were uniformly good; but, as he found it necessary to use a high initial dose, the extent of the skin reaction was very considerable. This took the form of telangiectasis or pigmentation, and although lessened by a reduction of the initial dose, was not altogether avoided thereby. Massive initial doses can also produce a severe œdema and swelling locally that may cause dysphagia or dyspnœa. In the last 8 cases of actinomycosis of the head and neck that he had to treat he therefore tried a "protracted fractional" technique in which the massive dose is dispensed with and permanent skin changes do not occur. As he points out, the advantage here, apart from avoiding a scar, is that if the first course of treatment is not entirely successful, the chances of subsequent treatment by X rays are not destroyed by skin changes. In the protracted method a sufficient dose has been applied in a series of 4–10 irradiations given on successive days, and instead of weeks or months it takes only a matter of days. Of the 8 patients thus treated, 7 now show no signs of the disease and the eighth died of another malady. In the cases of actinomycosis of the internal organs, however, the results have not been so good. Harrison reports only on cases treated by the disjuncted fractional method, and these (8 in number) have all been unsatisfactory. He hopes to get better results by the protracted fractional technique. Iodides are largely used in the treatment of actinomycosis and Harrison thinks them useful in combination with other forms of treatment, but not likely to bring about a cure by themselves.

THE BRONCHIAL MUSCLE IN ASTHMA

AFTER a careful investigation of the intrinsic nerve-supply of the human lung, Dr. J. B. Gaylor,[1] of Glasgow, makes suggestions as to the functional significance of his findings. Perhaps the most interesting of these refers to the sensory nerve-endings (almost certainly vagal) which he and other observers find in the bronchial muscle. He points out that this muscle is not a continuous sheet, but arranged in more or less circular and oblique branching bands with spaces between, so that on contraction it must shorten as well as constrict the bronchi. Conversely, when the lungs are stretched in all directions by inspiration, the muscle must also be stretched both by the lengthening and the dilatation of the bronchi. The sensory endings lie chiefly at the junctions of the muscle bands and are very numerous where a bronchus branches; exactly similar endings are found in the carotid sinus, and the only stimulus which these two structures can have in common is that of tension. Gaylor suggests that the Hering-Breuer reflex, which brings about expiration when inspiration has reached a certain pitch, originates in stretching of the muscle bands and stimulation of these endings. In asthma, supposing the bronchi to be tonically contracted, the adequate degree of stretching in the muscle would not be attained until inspiration had exceeded its normal range, so that it would be unduly prolonged, as is actually the case, and expiration would be delayed. Once expiration had been initiated, the bronchi would tend to close down and obstruction would be particularly marked where branching occurred. This theory of asthma is incomplete, however, since it takes no account of the reverse phase of the Hering-Breuer reflex—namely, the initiation of inspiration when expiration reaches a certain pitch. Following the same argument, the stimulus for this should be shortening of the bronchial muscle, and inspiration should recur shortly after expiration has started. It is, of course, possible that some such nervous disturbance may contribute to the difficulty in expiration, but the whole theory is speculative and additions to it are hardly justified. For instance, sensory fibres also end in the epithelium, and while admittedly muscle stretch is more likely as an adequate stimulus, there seems nothing to disprove the possibility that the passage of air over the mucosa in some way initiates the Hering-Breuer reflex. Whichever set of sensory endings is chosen for the reflex, there is some difficulty in accounting for the function of the other; the balance of probability lies on Gaylor's side since he very reasonably supposes that the epithelial endings might subserve the cough reflex; their arrangement is such that they would be strongly stimulated by stripping of the epithelium. Local reaction and secretion, and possibly bronchial peristalsis, he believes to be brought about by axon reflexes for which there is ample provision. It should be emphasised that the paper in the main is an account of painstaking histological research, any appreciation or criticism of which would necessarily be of a technical nature. The more generally interesting and controversial physiological applications are advanced incidentally.

LICIT AND ILLICIT TRAFFIC IN DANGEROUS DRUGS

AT its latest meeting—the eighteenth of the series—the Advisory Committee of the League of Nations on Opium and other Dangerous Drugs reviewed the whole situation as regards international control. The main features of this situation are a progressive shrinkage in the production and distribution of the drugs for legitimate commerce, and a disquieting increase in the clandestine manufacture and traffic in opium, its derivatives, and other narcotics. A novel feature was disclosed in a process, discovered in Hungary, by which the opium alkaloids can be extracted direct from the dried poppy plant (poppy straw), without passing through the intermediary stage of raw opium. By this means morphine can be extracted from the poppy straw, which has previously been wasted, such morphine being capable of competing favourably with that derived from raw opium. This discovery is calculated to exert considerable influence on the future manufacture of opium alkaloids, and it was resolved by the advisory committee that the question, in all its bearings, should be discussed at the next session, in November of this year. A memorandum prepared by the secretariat of the League gave the average annual world-production of raw opium, for the years 1928–32, as 1385 tons. Moreover stocks, amounting to 3000 tons, were held at the end of 1932 in the various countries, excluding China. The producing countries, like Persia, are accordingly seeking new markets; others may conclude that the need for the promised limitation of production of the raw materials is strongly emphasised. Reference has already been made in our columns to the highly unsatisfactory position in Bulgaria with its increasing production of opium and its manufacture of enormous quantities of heroin in disregard of treaty obligations. Inasmuch as it was the exceptional imports of acetic acid anhydride into Bulgaria which led to the discovery of the clandestine production of heroin, of which acetic acid is a constituent, the advisory committee is recommending all Governments to furnish statistics of their imports and exports of acetic anhydride, together with their origin and destination. The lamentable situation in China was deplored by the representative of that country; not only is she the victim of illicit imports of morphine, heroin, and cocaine sent from other countries, but is herself a large producer of opium and has within her borders clandestine manufactories of the narcotic alkaloids. Manchuria and Jehol, now outside the jurisdiction of China, are, despite a Government monopoly system, increasing the poppy cultivation and in clandestine factories are manufacturing morphine and heroin, which are smuggled to the United States and other countries.

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[1] Brain, 1934, lvii., 143.

From a recent answer given in the House of Commons it appears that the area under cultivation of the opium poppy in British India has now been reduced to 37,012 acres. The export of India opium, chiefly to States in the Far East, continues; some 2000 chests, of 140 lb. each, were exported in the year 1932, about half of which was dispatched to the Straits Settlements. The price realised is 4000 rupees per chest.

FOREIGN BODIES IN THE ABDOMEN FOLLOWING OPERATION

An extraordinary case of tolerance to the presence in the abdomen of a foreign body left behind in the abdomen is noted this week in our medico-legal columns. The frequency of this accident is the subject of an interesting article in a recent number of the *Policlinico*,[1] where Dr. G. Rizzo describes the case of a woman, aged 25, who had a laparotomy performed for pelvic trouble following an abortion. The wound had practically closed, but an abdominal fistula remained from which exuded pus and some blood also during menstruation. Pain, however, continued, and four months later she was admitted to hospital where examination showed a fistula above the pubes and a large mass to the right of the uterus about the size of a fœtal head. Laparotomy disclosed that the mesentery, cæcum, sigmoid, and a portion of the small intestine formed a large mass with the uterus and adnexa on the left side. After separation of the parts involved, a gauze tampon 7 × 5 cm. was found in the midst of the mass. Recovery was uneventful and the patient left the hospital 33 days after the operation.

The interesting fact in the story is that, as would be expected, radiological examination failed to show the presence of any foreign body, a failure that would not have happened in the case noted on page 381. The question is raised whether by any means a gauze tampon could be rendered visible to X ray examination. Reduer states that the frequency of the occurrence of a foreign body being left in the abdomen after operation is about one in a thousand cases. It is to render the diagnosis of foreign bodies which are invisible to X rays possible, and to relieve the surgeon from grave responsibility, that many surgeons have suggested the use of some material which would be visible to X rays during operations. Halban suggested placing a nickelised iron round each tampon, while Döderlein uses a bronze wire. Reduer himself proposed the placing into tampons and compresses some means of contrast which would have the same absorbent qualities and the same sterilising properties as gauze, such as a thread 2–3 cm. long, impregnated with some substance opaque to X rays, such as silicate of zinc, tannate of lead, or wolframate of zinc. He has shown by radiograms how satisfactory is this method, thanks to which large or small tampons become visible to X rays when left in the abdomen or other region of the body.

Dr. Rizzo asserts that every person subjected to abdominal operation should be exposed to radiological control. By this means the avoidance, sometimes catastrophic, of apparent cures after forgotten tampons may be eliminated or their consequences minimised, to say nothing of relieving the operator from accusations of neglect and protecting him from being mulcted in damages on the part of the patient.

FACTORY HEALTH AND HAZARD

Some knowledge of bygone reports would be needed for a full appreciation of the descriptions of modern industry given by the Chief Inspector of Factories in his annual report[1] which has just been issued. Factories are increasing in size rather than in number; single-storied buildings for the most part, they are well-constructed with adequate air space, good heating and ventilation, excellent lighting, and up-to-date sanitary arrangements. Electric drive is replacing steam in rolling mills and in the textile trade; electric welding is transforming shipbuilding and constructional engineering. At one large iron works more than 700 houses are to be erected for the employees; and we read that factory life raises the standard of personal hygiene among girls, and that the net result of industrial life upon women is good and getting better. Risk has arisen in the past as new organic compounds have been introduced, particularly as solvents; but now Imperial Chemical Industries Ltd. have arranged for each compound to be physiologically tested before it is brought into use. But all is not reformed. Bat's-wing gas burners, and even candles, still illuminate tenement factories in Sheffield, while the toll of avoidable accidents is unduly large, and will, as was pointed out in our columns last week (p. 338), remain so until more attention is paid to safety devices. It is certain that active safety committees can exert a beneficial influence upon both frequency and severity rates; one interesting scheme was the issue every week of packets of cigarettes to the group of workers that had no lost-time accident, each packet being contained in a wrapper bearing an appropriate safety-first slogan. This led to a particularly high standard of safety being reached.

Various occupations have no recognised hazard, but Dr. J. C. Bridge is inclined to regard this as due to lack of data which cannot be gathered until more whole-time doctors are attached to works; on the whole however he holds that industrial employment does not affect the worker adversely. Cases of lead poisoning remain few; but of two workers manufacturing lead arsenate, one exhibited definite symptoms of lead without any signs of being affected by arsenic, while the other developed arsenical poisoning without any symptoms of lead. Epitheliomatous ulceration from contact with coal-tar products claims many victims; there were 40 deaths. Periodical examination of those exposed to risk provides safety by affording prompt treatment; there was no fatal ending among 50 cases so examined, as compared with 3 fatal cases among 25 where no examination was offered. Cancer of the bladder is 38 times as frequent in chemical workers as in the male insured population, due apparently to contact with certain coal-tar derivatives. Fourteen cases of cancer of the nose, 13 of them fatal, among those employed at a nickel refinery works remain as yet unexplained. Further investigation of dusty trades has found in sand-blasting a grave risk of silicosis; fortunately, in most instances sand can be replaced by steel shot in the blast, and this almost eliminates the risk. Attention is called in the report to the way in which dust opaque to X rays may simulate fibrotic deposits in radiograms of the chest, and so introduce a difficulty in diagnosis. Diethylene dioxide, used in making artificial silk, gave rise to five deaths from acute hæmorrhagic nephritis with suppression of urine and uræmia; the toxicity of this compound was previously not recognised.

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[1] Policlinico. Practical section, 1934, xli., 1056.

[1] H.M. Stationery Office. Cmd. 4657. 2s.

Notwithstanding the prevalence of unemployment, several instances are quoted of excessive hours of work: unbroken spells of 22½ and 37½ hours, 89¼ and 78 hours per week. The two-shift system has proved its value in emergency and has in a few industries been adopted as a regular method. Welfare accommodation, particularly at mess rooms, is becoming so general, although not compulsory, that workers conplain if it is not provided, thinking its absence to be illegal. The psychological effect of bright workplaces is receiving attention; in one case the walls, fronts of galleries, and doors are painted primrose, handrails light green, steel columns, beams, gantries, and roof trusses aluminium; in another machines are painted light blue to show up against a dark background, and the jibs of fixed cranes and runways are a brilliant red. Indeed, throughout the report there are instances of advance and progress, rather than, as of old, of backsliding and grinding the face of the labourer.

A REGIMEN FOR RHEUMATISM

THE idea of "soil and seed," as applied to disease of the joints, enables us to make a broad distinction between the mainly infective (arthritis) and those in which infection is reduced to a minimum (arthroses). For the latter group, which are sometimes termed degenerative, a failure of nutrient substances to construct or preserve normal bone and cartilage—i.e., a metabolic disorder—is often held responsible. Such a "faulty metabolism" might arise from gastro-intestinal disturbances resulting in interference with absorption of foodstuffs, and Burnett and Ober,[1] of the arthritis clinic of the Peter Bent Brigham Hospital, Boston, describe the regimen by which they try to get this absorption back to normal. Their emphasis is laid on the need for proper habits of mastication of food and for its unhurried passage through the colon in order that complete absorption may be obtained; indeed their desideratum is to obtain the dejecta completely formed and entirely segmented, which in their view signifies satisfactory digestion or "anabolic nutrition." By means of charcoal or millet seeds the intestinal rate was determined, and two-thirds of their patients were shown to have an irritable colon and rapid intestinal rate. The general plan of dieting adopted is to give little food at breakfast or lunch but a substantial amount at dinner; the total caloric value should be sufficient to supply the needs of those who are actively occupied. The diet must be complete and must contain a fair amount of vegetables to make the aliment alkaline. Fruit is taken according to requirement and not till the later meals of the day, so that the consistency of the dejecta after breakfast may be a guide. An essential is the omission of all laxatives, oils, or enemata. Two glasses of water are advised at each meal, one more on rising, and one at bedtime. Exercise is greatly restricted where there is much wasting, and adequate sleep is necessary. If the digestive fluids are deficient dilute hydrochloric acid, gastric enzymes, and enteric-coated pancreatic preparations may be useful. Injections of insulin are sometimes helpful to patients who are abnormally lean. The usual physical methods of treatment—rest, heat, massage, or exercise—are employed to reduce the swelling, alleviate the pain, and restore the action of the joints. Finally, as it takes months and years of anabolic nutrition to overcome the deficiencies in these cases, constant encouragement towards greater activity is very necessary. Of several hundred patients at the clinic, many could not be taught or would not coöperate; but of those who followed the instructions for at least five months more than a quarter are said to have been cured, with relief of pain and swelling and normal motility of the joints, while about half have improved.

GASTRO-JEJUNAL ULCERATION

EXAMINATION of the records of patients on whom gastric operations were performed 20 or 30 years ago is making it easier to understand the cause of gastro-jejunal ulceration. Mr. A. J. Walton, who has lately written in these columns [1] on the prognosis of peptic ulcers treated by operation, has also described [2] in detail his experience of this particular complication. In 1859 gastric operations which he personally performed, there were, he says, 31 cases in which gastro-jejunal ulcer subsequently developed—an incidence of only 1·6 per cent. They are divided into those in which operation was done between the years 1913 and 1922 inclusive, and those operated on in the ten years since. In the first ten-year period 765 cases show an incidence of 2·3 per cent. (18 developed gastro-jejunal ulceration) and this lends support to the assertion that the number of cases increases with the time over which the patients are followed. Such figures, however, cannot be interpreted aright without consideration of other factors, such as the experience of the operator and the nature of the operation. Walton does not find any evidence in his cases for an increased incidence with anterior gastro-jejunostomies, and his general conclusion is that gastro-jejunal ulceration is almost entirely a complication of gastro-enterostomy for ulcers in the region of the pylorus and the duodenum. In only 2 of his 31 cases did it follow partial gastrectomy, and he believes that the more extensive the gastrectomy the less chance there is of anastomotic ulcer. The nature of the original lesion is of paramount importance: thus anastomotic ulcer never follows an operation for carcinoma—a fact which in part at least explains its low incidence after gastrectomy. Of the ætiological factors hyperchlorhydria is generally considered to be the most important, and it is noteworthy that the average acidity of the gastric juice has been found to be higher with duodenal than with lesser curve ulcers, and to be relatively higher, again, in those cases of duodenal ulcer which later developed gastro-jejunal ulceration. Walton agrees with other observers that infection elsewhere is liable to increase the incidence of ulceration. He also finds some reason to believe that incomplete apposition of the gastric mucosa, such as may occur at the point at which the continuous mucosal suture is begun and ended, may determine the site of an ulcer—more especially when there has been excision of the redundant mucosa along the suture line. Unabsorbent sutures have not the importance in the production of these ulcers which was once attributed to them.

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[1] Burnett, F. L., and Ober, F. R.: Amer. Jour. Med. Sci., July, 1934, p. 93.

[1] THE LANCET, July 7th, p. 37.
[2] Brit. Jour. Surg., July, 1934, p. 33.

Two clinical types are described by Walton. One shows hæmorrhage as the main symptom, and he states his opinion that hæmorrhage after gastro-enterostomy for duodenal ulcer always comes from a marginal ulcer and never from the original ulcer. The other shows symptoms of indigestion, more or less mimicking the original lesion, but with vomiting conspicuous and pain often referred to the left side and to the lower abdomen rather than the epigastrium. Taking all the cases together pain is much the most prominent symptom. For treatment Walton strongly advocates partial gastrectomy and quotes Finsterer as stating that if three-quarters of the stomach is removed recurrence never takes place. His own figures show 1 recurrence in 61 cases.

TREATMENT IN THE OXYGEN CHAMBER

A CHEMICAL study of the changes brought about in normal persons, and in patients suffering from cardiac and pulmonary disease, on breathing an atmosphere containing 45 per cent. of oxygen for periods of a week or more has been made by D. W. Richards and A. L. Barach.[1] The chief changes found in two normal subjects after a week in the oxygen chamber were a considerable fall in pulse-rate and a small increase in arterial oxygen saturation and in the level of the CO_2-dissociation curve. The patients investigated fell into three main groups—arterio-sclerotic heart disease, rheumatic heart disease, and pulmonary fibrosis with cardio-respiratory insufficiency. A majority had congestive heart failure with œdema, and all had failed to improve on usual measures such as rest, digitalis, diuretics, and oxygen by nasal catheter. On transference to the 45 per cent. oxygen chamber there was usually some relief of dyspnœa and restlessness within a few hours, and in some the relief was progressive, becoming complete in several days. This was accompanied by a raising of arterial oxygen saturation to normal levels, increase in the blood CO_2, diuresis, and increase in the urinary chloride, and a fall in pulse-rate and in venous pressure. The arterio-sclerotic and pulmonary groups gave a much better response than the rheumatic group. It is interesting to note that dilution of the blood appeared to occur as the signs of congestive failure cleared up; and Richards and Barach correlate this with the decrease of vital capacity of the lungs sometimes observed at this time, suggesting a further widening of the pulmonary blood depôt. When the changes brought about by treatment in the oxygen chamber are compared with those which accompany the relief of congestive failure without oxygen treatment, the main differences are found to be a greater quantitative increase in arterial oxygen saturation, increase in blood CO_2, and decrease in blood chloride in the oxygen-treated cases. This form of treatment seems to be useful in any case of cardio-pulmonary disease in which dyspnœa resists other measures, and anginal pain, too, is said to be relieved by it; presumably this refers especially to angina occurring at rest and apart from recent coronary occlusion. From the chemical point of view Richards and Barach state that, while a low arterial oxygen saturation is a certain indication, oxygen-want may be present when this is within normal limits. Cyanosis also is not a safe criterion of oxygen-want; thus the treatment may be beneficial when cyanosis is slight and of little use when it is conspicuous.

AIDS TO CHOLECYSTOGRAPHY

THE introduction of tetraiodophenolphthalein marked a great step forward in the diagnosis of gall-bladder diseases, but this method has the disadvantage that the drug is somewhat troublesome to administer and takes several hours to enter the gall-bladder. Attempts have been made to speed up the process, and S. Zanetti, of Bologna,[1] has used for this purpose a subcutaneous injection of 1 mg. of adrenaline an hour after the patient has taken 80–100 g. of sugar. In healthy persons, Zanetti says, the shadow appears two hours and sometimes less after the injection and lasts for several hours more. Its depth varies with the standard of hepatic and biliary function, and delay in appearance is, it is stated, of diagnostic importance, showing a failure to reduce glycogen or to concentrate bile rapidly which ordinary cholecystography would not reveal. Somewhat similar investigations have been made by D. Barbieri and F. F. Tosatti,[2] who have studied the rapidity with which the tetraiodide shadow is obtained in normal persons following the intravenous injection of a number of substances, including adrenaline, pituitrin, urotropine, histamine, acetylcholine, and hypertonic and isotonic solutions of sodium chloride. Of all these substances acetylcholine served to give the earliest shadow, the gall-bladder being visible within half an hour, and consistently and clearly seen within an hour, of the injection of the tetraiodide. The dose was 3 cg. of acetylcholine injected intravenously a quarter of an hour before the tetraiodide. Urotropine, they also found, caused some acceleration in the appearance of the shadow, satisfactory cholecystograms being obtained in 1 hour 45 minutes from the time of injection. With adrenaline, however, the gall-bladder only became visible after about 4 hours and 40 minutes, and Barbieri and Tosatti conclude that whereas acetylcholine, urotropine, and pituitrin all accelerate the procedure of cholecystography, adrenaline and histamine could not be shown to do so. Their results were obtained on 20 normal patients, and have not as yet been applied to cases of hepatic disease. The difference between these findings and those of Zanetti are not perhaps as surprising as appears at first sight, for the number of cases examined is relatively small, and much variation has been noted in normal persons when tetraiodide is employed alone.

THE BACKWARD AFRICAN NATIVE

IN December last the Secretary for the Colonies asked the governor of Kenya whether he was in favour of the proposal put forward by Dr. H. L. Gordon for a collaborative research into the nature and causes of native backwardness in East Africa A memorandum written by the director of medical services and approved by the director of education and the chief native commissioner has now been signed by the governor and sent to the Colonial Office. It is strongly in favour of the proposal. In a recent address to the Kenya Society for the Study of Race Improvement, Dr. Gordon pointed out that East African backwardness was formerly attributed entirely to nurture and not at all to nature; if this were true, research into the social heritage of the native would be sufficient. He believes, however, that it is only by inquiry into the biological heritage of the African that he can be given an appropriate place "within an East African State shared in by European, Asian, and himself." Observations made by Dr. Gordon and Dr. F. W. Vint which bear on the development of the brain of the African native were recently described in our columns (1934, i., 357).

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[1] Quart. Jour. Med., July, 1934, p. 437.

[1] Presse méd., May 23rd, 1934, p. 849.
[2] Policlinico, June 25th, 1934, p. 963.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XV.—PROGNOSIS IN CRETINISM

CRETINISM is one of the diseases which were first, and for a long time, recognised in early life before adults were known to be also affected. It was described by Paracelsus in the fifteenth century, whereas it was only in 1871 that Hilton Fagge prophesied that adult cretinism might occur, and in 1873 that his senior colleague at Guy's Hospital, Sir William Gull, described a "cretinoid condition supervening in adult life in women," to which W. M. Ord, in 1877, gave the name myxœdema. The delay in the recognition of the adult form of thyroid deficiency and its correlation with cretinism may reasonably be explained (1) by the much more striking manifestations of cretinism, due to arrest of development and growth both in body and brain, the latter often amounting to mental deficiency; and (2) by the difference between (*a*) the large number of cretins in parts of Europe where goitre was endemic, and (*b*) the sporadic and relatively infrequent occurrence of adult myxœdema. The effect of thyroid insufficiency in the fœtus and infant before complete development and growth have taken place must obviously be more far-reaching than it is when the hormonic secretion fails in an adult. There are all grades from the endemic cretin idiot, through sporadic cretinism, myxœdema of infantile, childhood and of adult life, to benign or non-myxœdematous hypothyroidism. Though endemic cretinism was known in the fifteenth century the sporadic form (T. B. Curling, in 1850, recorded two cases probably of this nature) was not definitely described until 1871 by Hilton Fagge, when endemic cretinism had died out in this country. When, as in endemic cretinism, the thyroid insufficiency begins in fœtal life the damage is greater; secondary changes occur in the central nervous system and elsewhere. Changes in the parathyroids are suggested by the occurrence of cases of "nervous cretinism" with cerebral diplegia not only in endemic cretinism but occasionally also in the sporadic form. There appear to be transitions between the endemic and sporadic forms of cretinism, and some of the worst cases seen in this country may be of essentially the same nature as those seen in districts where goitre is markedly endemic. It may be difficult to decide whether a given case should be regarded as one of sporadic cretinism or of infantile or childhood myxœdema due to some post-natal thyroiditis. There is not any tendency for the disease to be self-limited and to undergo spontaneous cure; untreated cretins may live long, but remain dwarfs and mental defectives. The prognosis as regards improvement depends on life-long thyroid treatment.

From what has been said it follows that the earlier in life thyroid deficiency begins the less likely is well-marked benefit to result from thyroid treatment. Further, the earlier this treatment is started the better, generally speaking, are the prospects of success. There are, it must be admitted, exceptions to this rule; in endemic cretinism and in sporadic cases with spasticity the response to treatment, especially as regards mental improvement, is usually unsatisfactory; in this "nervous cretinism" the administration of parathyroid in addition to thyroid extract has been recommended (McCarrison). Otherwise the benefit due to thyroid treatment is striking, even dramatic, and rapid.

Treatment by thyroid preparations should begin as early as possible after the condition is diagnosed and be continued for life. Administration should be oral, and the proper dose must be determined for each patient, for this may vary considerably in different individuals. As some cretins are hypersensitive to thyroid, the first dose should be small—a total of ¼ to ½ grain in the 24 hours, preferably given in two instalments of thyroideum siccum B.P., or its equivalent of some other preparation. The cretin should then be carefully watched for symptoms of intolerance—namely, vomiting, diarrhœa, faintness, and fever. This intolerance has been overcome by a series of small doses (J. Thomson). If no toxic symptoms follow, the dose should be repeated on the third day so as to allow for the latent period before thyroid extract exerts its effect. The dose should then be increased every week until satisfactory results are obtained without toxic symptoms, such as malaise, headache, nervousness, sweating, and progressive loss of weight, which show that the amount is excessive. In patients otherwise doing well thyroid treatment often causes troublesome enuresis. For a baby a daily dose of two grains commonly acts well, and for older patients double that dose or more may be necessary to get the best results, which are obtained by amounts just short of those causing signs of intolerance. The most exact means of determining the dose is estimation of the basal metabolic rate, but as this is difficult in babies and young children careful clinical observation must be relied on.

If the treatment is interrupted the symptoms return after a few weeks, even when great progress towards the normal has been made; the treatment is substitutional and not curative.

As already mentioned the results of treatment vary, but usually after a few weeks physical improvement is quite obvious, especially in the facial appearance. Sometimes the coarse hairs drop out at an early stage to be succeeded by a better crop. Growth is particularly rapid at first. When treatment is begun in late childhood softening of the bones may follow, and necessitate rest. Eventually the one-time cretin may become physically indistinguishable from ordinary people, and be able to earn a living. Mentally, however, improvement is usually less perfect, and children are more or less backward for their age. There are exceptions; a cretin treated by Cockayne gained a scholarship. Females may conceive and have normal offspring.

Prophylaxis.—When a goitrous mother has had a cretin child it would be advisable to treat her with thyroid during subsequent pregnancies.

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SPECIAL ARTICLES

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF NEUROLOGY, PSYCHOLOGICAL MEDICINE, AND MENTAL DISEASES

A MEETING of this section, with Dr. EDWARD MAPOTHER (London), vice-president, in the chair, was devoted to a consideration of the

Differential Diagnosis of Functional and Organic Nervous Disorders

Dr. GEORGE RIDDOCH said he proposed to use the word "functional" in this connexion as equivalent to psychogenic. In some disorders the signs present may indicate an organic change in the nervous system though the abnormal physical alterations underlying it cannot be demonstrated by the pathologist. The main burden in the differentiation of these conditions falls therefore on the clinician. The value of a careful history covering the whole of the patient's life is to be emphasised. The psychoneurotic will almost always have shown from childhood onwards an incapacity to strike a bargain with existence; this failure of adaptation should always be a requisite for diagnosis. Unless this search for a psychogenesis be made such symptoms as sleeplessness, fatigability, and headache may not be recognised in some cases as signs of an organic affection. Even where there are no physical signs, such a symptom as transient diplopia should make the physician suspicious of organic disease, as in disseminated sclerosis; in this condition emotional changes are not infrequent, and may be wrongly regarded as confirmatory of a functional disorder. Passing from symptoms to physical signs, one had to exclude the exaggerated reactions to fear which might, however, be due to hyperthyroidism. The physical signs in neurosis would be those of hysteria. Here diagnosis must rest on (1) the absence of signs of organic disease, and (2) the presence of positive signs of hysteria. There are a number of findings, such as papillœdema and optic atrophy or a true extensor plantar reflex, which are invariably of organic origin; among these are dysphasia, true nystagmus, absence of vestibular reactions, local muscular atrophy with electrical alterations following paralysis, and abolition of the tendon jerks. Certain sensory changes were likewise organic—e.g., homonymous or bitemporal visual field defects, especially if quadrantic, pain referred to the distribution of the spinal posterior roots, lightning pains of tabes, dissociations such as may be found in syringomyelia. Always, however, the observer must be certain of the adequacy of his methods of diagnosis, and he must be familiar with the normal variations. Where the plantar toe reflex is doubtful, the response in the quadriceps and hamstrings should be observed also. The differences between movements of voluntary withdrawal and what occurs commonly in severe spastic paralysis of organic origin should be easily recognised, once they have been observed.

The physical signs of hysteria, Dr. Riddoch said, are usually accompanied by a freedom from worry, which is indicative of the satisfaction the patient gets from this solution of his mental conflict. Since these symptoms depend on the patient's idea of what constitutes a paralysis or fit or disorder of sensation they do not conform to the rules of pathological physiology and anatomy. Hysterical paralysis is often selective. Voluntary movement appears to be impossible in the affected part, though there may be no wasting or reflex signs of organic significance. The muscles in question may be used in one voluntary movement and not in another. There is also display of excessive effort, shown by general violent exertion and also by strong contraction of the opposing muscles. Resistance to passive movement may be encountered; it must be distinguished from muscular rigidity due to pyramidal and extrapyramidal motor lesions. Contractures and disorders of gait should not present difficulty. The sensory changes are anomalous in that they do not conform to anatomical distributions. Sharpness of delimitation and response to suggestion are important points. The inevitable indirect consequences of organic sensory loss may be absent in hysteria—e.g., pupillary reaction to light brisk though blindness is complained of. In fits a number of points of distinction are available. In this connexion the possibility of confusing a hysterical amnesia with automatism following petit mal attacks must be considered. Chronic epileptics are often emotional; this characteristic is frequent in organic affections. Diagnosis finally must be recognised to be a matter not only of symptoms and signs but of the whole behaviour of the individual in the past as well as in the present. A neurotic, moreover, might develop organic troubles, and anxiety consequent upon physical disabilities might result in mental instability.

Dr. A. A. W. PETRIE said that the standpoint was shifting towards a search for physical causes. It was probable that in the future disorders now called psychogenic would be recognised as physiogenic. Consideration of the patient's whole make-up and circumstances often saved time in diagnosis: hypochondria illustrated the value of this inquiry. Neurasthenia was closely akin to the state of affairs seen after a debilitating illness. Any chronic associated factors such as anæmia, tuberculosis, or other chronic toxæmia had to be eliminated. It might be an early stage in a depressive psychosis. Myasthenia gravis might be mistaken for neurasthenia in rare instances. Encephalitis lethargica, however, was more likely to be mistaken for dementia præcox. Neurosyphilis had to be considered, especially when a neurasthenic attack occurred for the first time in middle age. In anxiety states there was often a mixture of sympathetic and parasympathetic symptoms. Where consciousness was lost epilepsy or some cardiac affection like coronary thrombosis might be suspected. Interparoxysmal symptoms were of value in clearing up the diagnosis. Hysterical reactions could be more quickly and accurately diagnosed if the situation of the patient received attention. Hysterical symptoms represented an idea of the patient tending to satisfy the subconscious purpose. The lesion would be usually a loss of function but associated with the petulant emotional reaction of the hysteric. The symptoms might be either on the psychological or the physical plane.

Convulsions might be difficult to diagnose if they occurred in an epileptic with hysterical manifestations; the combination with petit mal was often deceptive until unexplained enuresis or some other indication of the epilepsy was encountered. It must be remembered that slow-growing tumours might cause convulsions as long as 17 years before death. Localisation by mental symptoms was not trustworthy in these cases. In tumours of the frontal lobe the early appearance of mental symptoms led to errors in diagnosis. In attempting to distinguish between disseminated sclerosis and hysteria, the frequent coexistence of hysterical symptoms and those due to the organic lesion had to be considered; generally, also, the paraplegia, if it occurred, was more suddenly and dramatically complete in the hysteric. Hysterical paralysis might be followed by disuse phenomena. Even lack of control of the organic sphincters might at times occur. Usually, however, the general conduct was excellent apart from the disorder complained of. The psychological basis of a hysterical paralysis could often be traced. The behaviour of the patient during physical examination was of much help.

Fits at times, and in their early stages, represented definite symbolic movements on the lines of a compulsion neurosis. Sexual incompatibility might manifest itself as hyperæsthesia or other disturbances associated with dyspareunia; these could readily be interpreted when their basis was recognised. They might even be elaborated into hypochondriacal ideas with abnormal paranoid trends. Mutism and stupor were not always easy to diagnose; somnolent cases of encephalitis lethargica, narcolepsy, and cerebral tumour might resemble functional stupor. Many cases of cataplexy proved to be hysterical. Neglect of the psychological aspect in any case might lead to the placing of undue emphasis on individual symptoms, with consequent failures in diagnosis.

The CHAIRMAN said that Dr. Riddoch had seemed to incline towards the psychological point of view in his emphasis on the positive criterion of psychogenesis in functional disorders. The carrying of this principle to excess was in practice the main cause of failure to recognise organic conditions. Moreover, the discovery of an adequate psychogenesis might be a very lengthy process such as one would scarcely be able to undertake unless one were already sure the condition was a functional one. In psychoneurotic patients it was easy to be misled by an ætiological red-herring. In considering all the history it had to be borne in mind that the mental symptoms of incipient and insidious organic disease were related to the type of personality and to details of personal experience; they might be quite indistinguishable from those of functional conditions. Where the organic affection was acute or rapidly advancing one found reductive symptoms, but if it developed insidiously, symptoms of decontrol, of emotional imbalance might be the main ones; the patient then became more than ever himself. Moreover, he distorted experience in various ways identical with those which we called mental mechanisms. If one based one's diagnosis on the discovery of apparent psychogenesis in the history, one might thus be led into error. There were few people who had not had experiences which would suffice to account for a neurosis if one took the customary view of psychogenesis.

Dr. GREIG ANDERSON (Aberdeen) pointed out the difficulties that arose if one used such a broad definition of the term "functional" as that proposed by Dr. Riddoch; he instanced epilepsy and narcolepsy. The distinction between neurosis and psychosis was a valid and fundamental one. The ambiguous term "borderland case" should be abandoned because it suggested a transition from neurosis to psychosis. Organic nervous disorder was from the first irreversible, it showed a definite stability, and followed a definite course. One saw this if one contrasted the patient who had disseminated sclerosis with a psychoneurotic. A patient's statement of his symptoms should not be accepted at face value; it should be inquired into and analysed. The chronological sequence of the symptoms was of great importance—e.g., in cerebello-pontine lesions. He agreed with Dr. Petrie as to the great care that should be taken before diagnosing a psychoneurosis in a middle-aged person who had previously not shown any such condition.

Dr. HELEN BOYLE (Hove) thought that the meaning of the term "functional" required clarification. In a larger sense there was no distinction between functional and organic. There might be abnormal physical change due to functional disorder; instances of this were mucous colitis, indigestion, and hyperthyroidism following anxiety states. Psychogenic fits might be quite indistinguishable from organic ones. The person as a whole must be considered and the patient seen alone if errors of diagnosis were to be avoided. Even in organic disorders a good bedside manner might be therapeutic. Physiological dysfunction following a psychogenic disorder should be dealt with as well as the underlying cause. Careful investigation of the whole life must precede diagnosis, and here one was obliged to consider religion, mysticism, and philosophy. C. G. Jung had presented this general conception in an illuminating way.

Dr. FERGUS FERGUSON (Manchester) recalled that the term "functional" was sometimes used to imply that the patient had nothing the matter with him, could control his symptoms if he chose, and did not require treatment. Patients found such a diagnosis most provoking. In a series of cases he had found that errors of diagnosis were most often made in the presence of dementia paralytica, diffuse frontal tumour, Parkinson's disease, cerebral arterio-sclerosis, myasthenia gravis, cerebral injury, and neuritis. It was wrong to suppose that general paralysis could not be present unless there were grandiose and expansive ideas. The history in disseminated sclerosis was often more helpful than were the physical signs. In cerebral arterio-sclerosis it must be remembered that the symptoms were not only focal. The patient's age, the condition of his arteries, and his psychological abnormalities were to be regarded; the blood pressure was not always high. Peripheral neuritis affecting the upper limbs or the lower limbs elsewhere than in the sciatic nerve often was overlooked in diagnosis. The distribution of the pain, the presence of tender spots and, possibly, reflex changes were to be considered; often it occurred in people who also had an anxiety state.

Dr. R. D. GILLESPIE (London) said the discussion had shown how opinions varied according to one's point of view. Dr. Petrie had emphasised the swing towards the organic side, but there had also been a change of attitude in the opposite direction. He disagreed with Dr. Petrie as to the possibility of curing anxiety states by remedying faulty methods of contraception. The distinction between functional and organic must be insisted on. It was necessary to elucidate the psychological history, however tedious and lengthy this might be. All physical symptoms and signs should be presumed to be of psychological origin unless some definite organic disorder be present. Some misleading effects of emotional disturbance may be observed in specially predisposed persons. Signs conform to the patient's conception of the disease in a psychoneurosis, but they must be relevant to the complaint. The time relation is of importance in determining psychological causes but there may be a long delay; because of this latent period of rumination, more than a temporal relation must be sought in psychogenesis. The negative characteristics of a psychoneurosis were its unlikeness in symptoms and in natural course to any known disease. There might also be a multiplicity of symptoms in various systems. Statistical probability as to the nature of a particular symptom was also important—e.g., vertigo. Mental examination should be part of routine examination. There was a midway group of cases which illustrated how psychological factors might be as potent as physiological ones; they were additive though not necessarily mutually replaceable. Asthma illustrated this, as did eczema and prurigo. The differentiation should be, not into psychogenic and physiogenic, but into how much is psychogenic and how much physiogenic.

Dr. DOUGLAS GRANGER (Bournemouth) remarked on the frequency with which problems of this sort occurred in everyday general practice. The advanced chronic neurasthenic might tax one's skill in diagnosis; one had to exclude any associated chronic physical factor. Anæmia might prove very intractable in this regard, but it was important to recognise it; treatment of the anæmia had in his experience even averted the need for certification in one patient. Myasthenia gravis might at first be seen with only fatigability, though later indubitable. The basal ganglia were more often affected than was perhaps recognised; lesions here might be responsible for transient symptoms such as tremor. The apparent apathy of Parkinsonism was deceptive; these patients were often by no means apathetic.

Dr. L. A. WEATHERLY (Bournemouth), president of the section, recalled the advice given him when he was a young man—viz., to regard every case of hysteria as due to an abnormal love of sympathy, and to get such patients to discover some pain or other on to which they might displace their trouble.

Dr. AUBREY LEWIS (London) pointed out that in the course of an organic illness a clinical picture might be found that satisfied every positive requirement for a diagnosis of functional disorder. Instances of this might be found in compulsive phenomena after encephalitis lethargica, depressive states in early G.P.I., hysteria after carbon monoxide poisoning, agitated depression in cerebral arterio-sclerosis. Apparent occupational neurosis might be observed in an extrapyramidal disorder; concentric narrowing of the visual field in gunshot wounds of the brain. A satisfactory psychogenesis may often be found even in these organic cases. It was not sufficient to view such phenomena from an exclusively psychological or exclusively physiological standpoint. The common explanation was that there was a constitutional predisposition released by the physical noxa, or reacting towards the manifestations of this. But there were some cases in which evidence for such an explanation could not be demonstrated satisfactorily. The problem raised by these cases was of considerable importance for practice as well as for theory. It not only required some working notion of the nature of the interplay between environment and morbid potentiality which resulted in mental illness, but upon the answer to it in a particular case must depend the prognosis and in some measure the mode of treatment adopted. Illustrative cases from a series collected at the Maudsley Hospital indicated the danger of the assumption that there were any positive criteria of a psychoneurosis which could be taken to exclude an organic basis.

Dr. T. A. WILLIAMS (Bordighera) considered the terms used insufficiently precise. A psychoneurosis should never be diagnosed by exclusion; there must be positive psychogenetic signs. These may be discovered in an ordinary consultation; it did not require a lot of time. Not all cases were either physiogenic or psychogenic. Status lymphaticus and other disorders might be the cause of dubious diagnosis; the metabolism of the patient should be investigated and chemical changes looked for. Fatigue might be a sign of dissatisfaction in patients with failing activity. In America people were highly but not accurately educated in psychogenesis, more so than in England; cults such as Christian Science and Free Thought had prepared the way.

Dr. MURDO MACKENZIE (London) suggested that the dissensions between the psychiatrist and the neurologist were of very ancient date. Functional disorders had to be differentiated by neurological criteria which did not interest the psychiatrist as such. The conversion symptoms in hysteria could be removed by crude suggestion. Anxiety and neurasthenia were terms which could well be dispensed with by psychiatrists.

Dr. H. SIMMONS (Bournemouth) quoted a case which illustrated the value of "sympathetic neglect" in such patients.

Dr. JAMES COLLIER (London) remarked on the insight the old Greek physicians had shown into the nature of these conditions; at Epidauros the methods used were worthy of note. The cleverness of some functional manifestations should be emphasised. Fits might be wrongly diagnosed by the most expert neurologist.

Dr. RIDDOCH, in closing the discussion, agreed that the terms "functional" and "organic" were misnomers but held that they had practical value. It was in the early stages of arterio-sclerotic dementia or G.P.I. that one met anxiety and other functional syndromes. Even a single interview often provided one with much material in the way of total history which helped one in dealing with the disorder. Neither the neurologist nor the psychiatrist could remain exclusively in his own field.

Dr. PETRIE referred to the large issues raised in this discussion. He did not consider, as some speakers had, that neurosis and psychosis could be regarded as sharply defined and separate conditions.

SECTION OF RADIOLOGY AND ELECTROTHERAPEUTICS

THE president, Dr. J. H. DOUGLAS WEBSTER (London), being in the chair, Dr. W. J. TURRELL (Oxford) opened a discussion on electrotherapy in the treatment of

Diseases of the Genito-urinary System

The main forms of electrical current employed were, he said, the constant or galvanic current, interrupted currents of low frequency, and interrupted currents of high frequency. The constant current owed its main effects to the reflex action induced by the stimulation of the cutaneous nerve-endings by the electro-deposition of various ions. In its local or polar application it was one of the most valuable remedies available. A zinc rod introduced within the uterus and connected with the positive pole of a source of supply carried a series of zinc kations with the positive charge down to the mucous membrane, where the hydrogen of the tissues and blood continued the conduction. The mucous membrane thus formed a virtual pole at which the zinc ion formed an oxychloride of zinc by interacting with the tissues; this chemical decomposition and the subsequent caustic action of the new compound thoroughly and intimately destroyed the mucous membrane. If the indifferent electrode surrounded the whole circumference of the abdomen the destruction was complete and evenly distributed. When uterine contractions causing pain were excited the treatment was stopped—usually in about 15 or 20 minutes. Pain in the early stages indicated complications in the appendages, in which case the treatment was unsuitable. Zinc electro-deposition was undoubtedly better than curettage, as it required no nursing-home, anæsthetic, or confinement to bed. A similar method could be used for treating gonorrhœa.

Interrupted currents of low frequency were of relatively little use in genito-urinary conditions. The Smart-Bristow coil indirectly helped in malposition of the uterus by restoring tone to the abdominal muscles, and the faradic coil was useful for the treatment of incontinence of urine. The Morton wave current thoroughly pervaded the muscle or organ treated, and excited more powerful contractions with less discomfort than any other method. It was invaluable in prostate cases. Interrupted currents of high frequency were very valuable in diseases of the genito-urinary system. There was probably no specific wave-length at which any particular micro-organism could be destroyed, but an optimum wave-length at which it could be destroyed at a minimum voltage. Diathermy was extremely valuable for spasmodic dysmenorrhœa, and the short-wave high-frequency currents would probably prove to be of special value in these cases. The short waves exerted their effects solely by a condenser field action. No current actually passed through the skin and, as a result, the tissues of the body reacted evenly and uniformly.

ENLARGED PROSTATE

Dr. F. HOWARD HUMPHRIS (London) said that physiotherapy provided measures by which some prostate patients might be saved the risks of a major operation and reprieved from the miserable sentence of wearing a suprapubic tube or the unhappiness of leading a catheter life. In applying the static wave current a metal electrode was passed into the rectum and laid alongside the prostate. Its other end was connected with one side of the static machine and a current was passed through which was interrupted from 120 to 150 times a minute. At each interruption any muscle in contact with the metal contracted and relaxed. The method had no electrical or heating action but was purely mechanical. Patients had reported even after the first treatment that the sense of weight in the perineum was less, and that at the end of ten daily applications the discomfort and necessity for getting up at night had disappeared. The condition of the bladder was improved by the stimulation and consequent restoration of tone to the muscle-fibres which were continued on to it. The gland was soon reduced in size and lost its tenderness. The treatment did not render subsequent operation more difficult. Contra-indications were long-standing cases, residual urine amounting to more than 3 ounces, cystitis, or renal complications giving rise to back pressure in the kidneys. On the other hand, X rays would relieve the symptoms even if the size of the prostate remained the same. Diathermy was the method of choice in infective prostatitis. The rationale of the treatment depended upon the power of the diathermy current to destroy the organisms in situ, and the temperature should reach 105° or 106° F. It was passed between an electrode in the rectum and a pad on the abdomen or a metal ring round the waist. Physiotherapy would not entirely supersede operation, but besides the operative mortality it would also obviate a high post-operative morbidity.

Dr. D. D. MALPAS (Bournemouth) remarked that surgeons often discouraged pre-operative therapy; he quoted the remark of one, "I wish you fellows would leave these prostates alone. My fingers hurt for days afterwards!"

Dr. AGNES SAVILL (London) spoke on the treatment of discharge in female patients. She said that in pruritus or eczema of the vulva she had for many years treated the skin alone, without permanent success, and had found it necessary to treat the discharge also. This might be due to inflammation of the lining membrane either of the cervical canal or of the uterus. It could be cured by ionisation, but if the discharge was from the uterus the treatment should be applied as far as the fundus. The treatment of discharge from the cervix was sometimes exceedingly difficult, because the inflammation was so severe that an electrode could not be passed right up. This was a reason why physical treatment had become discredited. When there was much inflammation and œdema affecting the whole or nearly all the genital tract, ionisation was not sufficient, but diathermy was invaluable. It was also necessary to treat the general condition, which was like an allergic one—the exudative diathesis.

Dr. G. B. BATTEN (London) reported that Dr. Justina Wilson had been using diathermy with a 4·5 metres wave-length with good results for all staphylococcal infections.

Dr. HOWARD HUMPHRIS said that a wave-length of 3·6 metres was more powerful; the shorter the more lethal.

The CHAIRMAN remarked that diathermy of this frequency was used to kill animal tumours, and suggested that the coincidence might be significant.

CANCER OF THE BLADDER

Dr. A. J. DURDEN SMITH spoke of radium treatment in this condition. None of the methods of treatment was, he said, satisfactory, because surgery still failed in a large number of cases and most bladder cancers were beyond the reach of surgery when first seen. The local glands were involved late and, indeed, might not be involved even in quite inoperable cases. Early metastases were rare. Excision in many cases was not difficult. On the other hand, the patients were usually past middle life and in a poor condition, and excision generally involved transplantation of the ureter. Radium, however, could be used when the growth was close to the opening of the ureter. The best way of using radium itself was to insert needles into the base of the tumour, but radon seeds were far more satisfactory and were being more and more used. They could be left permanently in position, were easier to manipulate than needles, and were more adaptable. They could be inserted by the suprapubic route or through the cystoscope. The latter procedure required great patience, and bleeding was often an obstacle. Radiographs should be taken in 48 hours and again in four days to make sure that all the seeds remained in position. The patient need not remain in bed more than four or five days or in hospital more than a week. The suprapubic route had the advantage that a growth in any part of the bladder could be treated and inspected at operation, and that the introduction of the seeds was more accurate. The operative mortality was between 0 and 15 per cent., and 31 per cent. of the patients remained alive for three years or more after surgical operation. Some 60 per cent. of cases could not be cured by surgery at all. Of these 60 per cent. and 3 per cent. of papillary cancers and 20 per cent. of the infiltrating cases might be alive three years after radium treatment. The mortality was low and complications were rare. There might be a very slowly separating slough. Papillary carcinoma was sensitive to radium and amenable to treatment when not too extensive. The infiltrating type was more radio-resistant, and operable cases should be treated by the surgeon. An extensive inoperable case might be made more miserable than before by widespread interstitial irradiation. Cystoscopic implantation of seeds should be limited to papillary cases where the growth was not more than 2 to 3 cm. in diameter. Larger growths should be dealt with suprapubically.

Dr. R. G. **Hutchison** described a method of treating carcinoma of the penis by means of radium needles applied round a collar of rubber sponge which was fitted over the organ. The results, though slightly better than most of those hitherto recorded, were not very encouraging. Most of the cases of epithelioma of the bladder treated at Manchester were in advanced stages. The growth was exposed by a suprapubic incision and radium was implanted through the wound. Three out of nine patients were alive and well after two and before three years. The technique had been shortened by the use of gold seeds, which were implanted beneath the growth and wide of it in every direction. The seeds must be distributed accurately, and the suprapubic method was necessary.

Dr. **Roy Ward** (London), speaking on carcinoma of the penis and prostate, said that cases must be chosen with care, eliminating those with a marked degree of surrounding infiltration and much invasion of the substance of the organ. On the other hand, a hypertrophic carcinoma, however large, responded well. If no glands were palpable it was unnecessary to irradiate the inguinal regions; when glands were palpable these areas were irradiated with moulded plaques. Of 26 cases, 13 had had palpable glands and 13 had not, but the first group had seemed to do better, 3 being alive at the end of 4½ years with no sign of disease. Of the other group, only one was alive at the end of the fifth year. For carcinoma of the prostate interstitial irradiation was the most satisfactory method. Approach was made either through the bladder or through the perineum. Radium could relieve the symptoms for varying periods of time.

Dr. **Durden Smith** asked why in some of Dr. Hutchison's cases the penis had been amputated. Dr. **Hutchison** replied that in the early days of the treatment the dosage of radium had sometimes been incorrect. Amputation was now much rarer.

Dr. **Bernard Ward** (Birmingham) said his own experience of X rays had been most unfavourable. The treatment had often caused a severe reaction as the bladder tissue was very radiosensitive. He preferred to cut as free a way through as he could. The transurethral method gave the patient the maximum of comfort for the remainder of his life. He said, in answer to the Chairman, that he had applied radium seeds and needles through the perineum and by the suprapubic method. He had excised as much as possible of the prostate and had planted the radium in what was left of it. He had also applied radium in a mould fitting the remainder of the prostate cavity. All these methods had proved disappointing.

Dr. **Durden Smith**, in reply, said that implantation by means of the cystoscope was tedious and uncertain and advocated the suprapubic approach. The cystoscope should be kept for very small growths and for palliative measures.

X RAYS

Dr. G. **Harrison Orton**, after discussing units of dosage, said that no attempt should ever be made to give a single massive dose to the kidney, and that the effect of divided doses must be carefully watched. X rays might be recommended in advanced inoperable cases for, although they did not cure, they might bring about a marked reduction in size of the growth. In the bladder also operation was the treatment of choice, and X ray treatment had proved disappointing in cases where operation or diathermy had failed. Immediate post-operative radiation might increase urinary infection. On the other hand, simple enlargement of the prostate was often favourably influenced by X rays, but the results were neither certain nor constant. Quite a large dose was necessary. When the prostate was malignant X ray treatment compared favourably with surgery, as the operation was severe and not very successful. Sometimes the growth disappeared completely under radiation, but sometimes there was only temporary improvement. Great care must be taken to reduce urinary infection to a minimum, and unless this could be done X ray treatment was contra-indicated. All patients should be kept in a nursing-home and carefully watched during the treatment.

Some growths of the testicle were quite radiosensitive, but they should be removed surgically and X rays then given to the glands. Tuberculous epididymitis responded very favourably to quite small doses of X rays. Cancer of the cervix was undoubtedly favourably influenced, but a recurrence was the rule rather than the exception. Combined X ray and radium treatment offered a better prospect than either given alone, but he would not apply radiation to any operable case. He thought that radium should be applied six weeks to two months after X rays, not before them. Cancer of the body of the uterus was rather less favourably influenced; X rays were superior to radium. Some types of ovarian growth were radiosensitive, but the best use of X rays was post-operative. X ray treatment was most successful for certain non-malignant conditions, such as menorrhagias of the menopause, menorrhagias at other periods with no definite pathological condition of the uterus, menorrhagias associated with fibroids, and cases where, owing to dysmenorrhœa or other conditions, sterilisation was considered advisable. The dose might be reduced to some 25 per cent. and spread over three months, when the patient had practically no disturbance. Every case must be thoroughly examined by the gynæcologist before treatment.

Small doses of X rays were stimulating, and might be used for sterility, amenorrhœa, and other ordinary disturbances of menstruation. Treatment could do no harm and was successful in about a quarter of the cases. Finally, pruritus vulvæ responded often very favourably to small doses, although some patients would not respond at all.

Dr. S. L. **Mucklow** (Cheltenham) said that prostatic enlargement gave a favourable response to X rays in selected cases. He described his technique, which embodied Schall's locating device of placing a lead ball beside the prostate and screening. X rays were best suited to the soft elastic gland. In 25 cases he had had 20 successes.

Dr. Batten suggested that the contra-indication of two or three ounces of residual urine practically meant all cases of prostatic enlargement.

The Chairman doubted whether epidermicidal doses caused permanent damage to the skin. Coutard, he said, had not seen a case in ten years' practice. It was possible that the criticism had been applied to the treatment of malignant disease of the bladder, in which X rays had not been satisfactory through causing fibrosis. Coutard's method did not now produce this disadvantage. He pointed out that cure was not only a matter of local action, and mentioned experiments in progress at the Middlesex Hospital on injections to increase radiosensitivity. He said that the value of X rays in this condition should be far better known. Many old gentlemen would be much relieved and there would be far less post-operative misery. He warned physicians to follow up cases treated by X rays lest the original condition should prove to have been malignant.

SECTION OF ORTHOPÆDICS

At a meeting of this section, with Mr. Harry Platt (Manchester) in the chair, a discussion on

Adolescent and Senile Kyphosis

was opened by Mr. C. Lambrinudi (London). He described five clinical types of adolescent kyphosis. In the first the onset is insidious in a patient who has otherwise no symptoms. In the second the condition appears slowly in a debilitated child (often above the average height) and may be accompanied by fatigue and pain. A third type appears suddenly in a child who may have had an injury or been suddenly subjected to heavy muscular effort—the type described by Scheuermann as "apprentice kyphosis." Pain is a definite feature, often with a rise of temperature, tenderness of the spinous processes, and spasm of the back muscles. A fourth type is seen in tall, lanky children, with some measure of endocrine disturbance. Albanesi has collected a series of such cases with changes in the sella turcica and the limbs. A fifth type of case presents an acute onset after a severe pneumonia. The features common to all types are the constancy of involvement of the lower dorsal region, the absence of angular kyphosis, typical X ray appearances, and, in all types except the last, a tendency to actual shortness in the hamstring muscles.

The radiographic appearance varies with the stage of the disease. In the earlier stages the intervertebral discs are narrow. The adjoining margins of the bony vertebræ are irregular, the anterior margin may be blurred. The ossification in the epiphyseal plates may be irregular, with an erosion of the body producing the web-like appearance. At a later stage the upper and lower surfaces of the vertebræ in proximity to the narrow disc may be sclerosed. The epiphyseal plate may be fragmented. The typical punched-out appearance, attributed by Schmorl to a hernia of the nucleus pulposus, may now be seen.

The speaker dealt with the prevailing views of the ætiology of adolescent kyphosis and devoted much attention to Schmorl's theory of changes in the intervertebral discs. He regarded oft-repeated minor injuries, stresses, and strains as possessing greater significance than the circulatory, infective, or endocrine factors which had been adduced. The condition of the hamstrings was also an important factor; the examination of 400 school-children showed a definite correlation between adolescent kyphosis and short hamstring muscles. He described a spring mechanism whereby the elongation of the hamstrings permits of flexion of the spine as in touching the toes with the outstretched hands. Children with short hamstrings are peculiarly prone to injure the spine if compelled to undertake violent and jerky toe-touching exercises. Such movements are conducive to injury and rupture of the intervertebral disc and subsequent hernia of the nucleus pulposus with destruction of the neighbouring portion of the vertebral body.

Dr. Jacques Calvé (Berck-Plage) discussed the movements of the spine in general and laid emphasis on the clinical fact that the pain of adolescent kyphosis is not situated at the kyphos but in the region of the compensatory curves immediately above and below. For this reason therapeutic treatment should consist of strenuous efforts to correct the compensatory curves by mechanical means. Untreated cases of lower dorsal kyphosis develop an exaggerated lordosis above and below the hump. The lordosis must be reduced so as to prevent shortening of the spinal length. Dr. Calvé illustrated the method of application of the Minerva plaster jacket, with special attention to the disposition of pads to correct the lordosis. He showed that a patient in such a jacket could undertake exercises of the upper and lower limbs in the reclining position with a view to increasing slowly but surely the effective length of the spine. The jacket, provided with a window over the hump and pressure pads above and below, obviated the need for continuous recumbency. By means of diagrams the speaker indicated the relation between the position of the nucleus pulposus and the amount of flexion and extension in the dorsal and lumbar vertebræ. He emphasised the extent to which pain could be minimised by correction of the cervical and lumbar lordosis.

Prof. H. A. Harris (London) illustrated the emergence of the pattern of growth in the spine from the earliest embryonic stages to adolescence. The general scheme of growth and differentiation was described in terms of the craniocaudal gradient. The pattern of growth in the human spine is disproportionate in that there is from birth onwards a relative shortening of the cervical column and a considerable lengthening of the lumbar part of the spine throughout the whole period of growth. The dorsal part of the spine in proximity to heart, lungs, and sympathetic chain maintains a constant proportion of the total length of the presacral vertebræ. The spine varies within narrow limits at all ages, occupying 37 to 40 per cent. of the total body length, and the dorsal part of the spine maintains an equally steady relationship of about 37 per cent. of the total spinal length. Both the primary centres of ossification for the bodies of the vertebræ and the epiphyseal plates of cartilage, which acquire secondary centres of ossification near puberty, appear first in the lower dorsal region. The bony epiphyseal plates limit the growth in length of the vertebræ in precisely the same manner as the epiphyseal plates of the long bones limit growth in length. The prolonged childhood of man, the postponement of puberty, and the late age at which growth in the lower limbs is terminated are accompanied by a postponement of the time of consolidation of the bony vertebræ by union of the epiphyses. Radiograms of various domestic animals, such as the guinea-pig, pig, and goat, showed that the secondary epiphyseal centres of ossification are present even at birth in accord with the early onset of puberty and consolidation of the spine in these forms. A comparable process is seen in the union of the three parts of the innominate bone in all animals at puberty. The proportion of the total length of the spine occupied by bony vertebræ or fibrocartilage illustrates the disproportionate growth in the various parts of the spine. From birth to adolescence the total thickness of the fibrocartilaginous discs in the cervical and dorsal region is doubled, whereas in the lumbar region it is increased fourfold.

Certain types of congenital abnormality of the spine were illustrated, and emphasis was laid on perversions of growth, nutritional disease, and infection as a cause of kyphosis. Illustrated cases were shown which could not be interpreted in terms of Schmorl's theories of injury to the fibrocartilaginous disc. Senile kyphosis Prof. Harris described as a reversion of the spine to its original blastemal stage, the cycle presenting many points in common with those seen in the lower jaw and the vault of the skull. In childhood the fibrocartilages are relatively free from the infective processes, whereas the bone and epiphyseal cartilage are prone to various infections. After middle age the bony vertebræ are peculiarly susceptible to senile changes, particularly nutritional diseases of the type of osteoporosis and osteomalacia. The cartilaginous discs and ligaments of the spine are peculiarly susceptible to inflammation, calcification, and ossification as a result of chronic infections, such as pyorrhœa, leucorrhœa, and gonorrhœa.

Mr. Ross Smith (Bournemouth) considered in detail the differential diagnosis of adolescent kyphosis and spinal caries. He described cases in which infection was an undoubted factor. He refused to accept Schmorl's theory as the sole explanation of the condition and maintained that congenital weakness of the cartilaginous plates above and below the nucleus pulposus could hardly explain a kyphosis which was always delayed until puberty. The relation of senile kyphosis to arterio-sclerosis was mentioned and toxic and nutritional factors were regarded as necessary concomitants to senescence and trauma.

Mr. W. Mackenzie (Newcastle-on-Tyne) presented a brief historical survey of the gradual classification of different types of kyphosis during the last twenty years. He showed a series of radiograms of typical cases which corresponded to the analysis of kyphosis into its existing types.

Mr. Whitchurch Howell (London) discussed the rôle of infection in the adolescent and senile type of kyphosis. In senile cases chronic sepsis was by no means uncommon. He made a plea for the early recognition and treatment, by an orthopædic team, of cases in children, particularly since the condition was closely interwoven with the problem of disability attributed to accidents in industry. It was not enough to examine the overgrown, the underfed, or the chronically septic. The general examination at the school clinic should be directed towards the early recognition and orthopædic treatment of postural defects.

Miss M. Forrester-Brown (Bath) strongly supported Mr. Lambrinudi's views on the importance of short hamstring muscles as a predisposing factor to spinal injuries. She had traced numerous cases of sacro-iliac strain to the vigorous attempts of certain pupils to stretch their shortened hamstrings. Toe-touching exercises were a danger to the spine unless the necessary degree of suppleness was acquired gradually. Many cases of adolescent kyphosis which could not always be conveniently treated in the recumbent position responded well if placed in a light Goldthwait brace and subjected to a gradual course of abdominal exercises calculated to develop good compensatory curves.

SECTIONS OF OBSTETRICS AND PUBLIC HEALTH

Under the chairmanship of Prof. J. M. Munro Kerr (Glasgow) the sections of obstetrics and gynæcology and the section of public health combined to consider the question: are we satisfied with the

Results of Antenatal Care

Dr. J. S. Fairbairn (London) said the object of the meeting was to review antenatal work, to see where its weaknesses lay, and to re-state its aims and the attitude of mind in which it should be approached, as well as the principles underlying its practice. The antenatal clinic, he said, deserved much of the credit for the impulse leading up to a general recognition of "midwifery as a branch of preventive medicine"—a slogan that had a wide vogue for a time, although all it implied was not understood and certainly not acted upon. In midwifery our first and chief duty was to learn what can be done by constructive physiology, that is, the adoption of measures tending to promote normal function throughout the processes of reproduction. After that came the "preventive" part, strictly speaking, being the removal or correction of possible causes of interference with physiological action. Lastly, came the watch for early evidence of disordered function and the effort to restore the normal before more serious or permanent trouble arises; for example, the testing of urine to discover albuminuria and the conditions underlying it.

Dr. Fairbairn referred to the importance of psychological reactions in pregnancy affecting the mother's health, a problem which had scarcely entered the philosophy of antenatal care, although it was now generally agreed that the largest factor in the failure to complete expulsion was the emotional effect of anxiety and fear and the early fatigue which followed in their train. Supervision of the pregnant woman must be thorough and continued; it called for varied forms of service from various types of worker and for close contact between them all. It was so integrated with the rest of midwifery practice that it could not be separated without both suffering. Its segregation in the public antenatal clinics has been open to criticism on this score, though the policy was forced on local authorities by the Act of 1918. In spite of team-work and a certain degree of uniformity in practice, our large maternity hospitals were not free from lack of coöperation: there was one member of the staff for the prenatal, another for the intranatal, possibly a third for the postnatal care of the mother, and certainly another for the mother and infant in the infant welfare clinic. The ideal supervisor of the mother and her infant throughout reproduction was the family practitioner; but, if he is to fulfil his part adequately, he must have assistance from a midwife working under his direction to undertake the observational, educational, and mothercraft services given by health visitors, social workers, and other officers in hospitals and public clinics.

Dr. G. F. Buchan (Willesden) analysed the objectives of antenatal care and considered where the present methods failed. He felt sufficient emphasis was not laid on the basic need for adequate nutrition; that there was not sufficient effort made to follow up women who failed to keep their appointments for antenatal examination; that hospital beds were not available in sufficient numbers for antenatal care. Present methods had not effected any material change in the healthiness of the offspring. The obstetrician would have to extend the scope of his work to include the child under four weeks and to correlate antenatal work and confinement with the condition of the child at birth. He spoke of the importance of adequate records; since at present the best methods of supervision were not in general use and no standard method had been laid down or applied, it was impossible to assess the value of antenatal care from the gross results. He thought a new kind of specialist was required; one whose functions would be first antenatal care in its wide sense, having regard to both the mother and the unborn child; secondly, the confinement; and thirdly, the care of the mother and child for a period after the birth. A wider specialism on these lines would secure better results than specialisms limited to the narrower fields of obstetrics on the one hand and pædiatrics on the other.

Prof. F. J. BROWNE (London) said that although the mortality of infants under one year had fallen, the neonatal mortality showed no corresponding decrease. The death-rate from eclampsia had changed but little during the last 12 years, although there was a distinct reduction in the last two years. And yet eclampsia was almost entirely preventable. One reason why antenatal care failed to influence statistics of morbidity was the increase in recent years of primary as compared with subsequent births. Much of the present antenatal care was, however, inadequate and ineffective. It was so easy to become slipshod when abnormalities were comparatively rare. It was difficult at present to assess the quality of antenatal work done by midwives. Was it too much to hope, he asked, that all the midwives of the future might be trained in the estimation of blood pressure? There was, he thought, much to be said for the whole-time clinic officer. They were usually keen and nowadays they must have had post-graduate experience in maternity work. They were less likely than general practitioners to be hurried. They could devise a follow-up system to ensure regular attendances, and as they saw so many patients they should become more skilled in diagnosis than the practitioner. Unfortunately their work suffered, both in interest and usefulness, from the fact that they were not allowed to give treatment. Effective antenatal care meant institutionalisation; the time was coming when none but normal midwifery (and perhaps low forceps cases) would be undertaken in the home.

Dr. ETHEL CASSIE (Birmingham) said it was useless to feel disappointed with a remedy which had never been properly applied. Whether at antenatal clinics or elsewhere antenatal care did not reach the standard laid down by Circular 145/M.C.W. (1929) and this was put forward not as an ideal but as a practicable minimum. In Birmingham in the year 1916 561 women attended 250 sessions; in 1932 8174 women attended 1892 sessions—representing no less than 50 per cent. of the women whose homes are reached by health visitors. But the standard of this antenatal work was for the most part not high enough, although as good as any in the country. This was shown in the records of stillbirths, maternal mortality in childbirth, and from puerperal sepsis. If antenatal care had not lowered maternal mortality it was because it had not yet had a fair chance of doing so. At a city maternity home where antenatal care was carried out at a high standard and where the medical officers were able to insist on patients carrying out directions, the maternal mortality-rate was low, the stillbirth-rate remained the same as that of the city as a whole, while the neonatal mortality improved. It was, she thought, essential that the obstetrician making himself responsible for antenatal care should be as much a physician as a surgeon; the tendency to combine obstetrics with gynæcology had led to some neglect of the expectant mother. Among the factors which delayed progress was the inadequate training of the medical student and midwife in obstetrics and infant care.

Discussion on these papers was opened by Dr. E. H. T. NASH (M.O.H. Hounslow) who spoke of the difficulty experienced by administrators in deciding on the relative value of schemes.—Mr. ALECK BOURNE (London) considered too much had been expected of antenatal care; good obstetrics was all-important.—Dr. GAUTIER SMITH (Bournemouth) emphasised the psychological aspect of obstetrics.—Dr. W. H. F. OXLEY (London) insisted on antenatal work being done by general practitioners and deplored the failure of antenatal clinics to reduce maternal mortality.—Mr. L. C. RIVETT (London) felt that the bulk of the work should be done by the midwife.—Dr. JANE TURNBULL (Ministry of Health) gave some figures illustrating the insufficient antenatal care given where the mother had died in childbirth. Such care should cover home supervision, home helps, and the provision of nutrition in necessitous cases.

The CHAIRMAN remarked on the differing aspect of the problem in cities and rural areas. He was of opinion that midwives should be responsible for normal midwifery in consultation with doctors. The best arrangement was for municipal midwives to work through the antenatal clinics. General practitioners should join in the scheme, possibly combining other specialties with antenatal care. The rural problem would require an extension of present methods with the practitioner playing the chief part.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

RACIAL AND PROFESSIONAL SALVATION

THE minister of public health recently warned us that any nation whose birth-rate falls to 18 per 1000 of the population is likely to become extinct, and pointed out that the Hungarian birth-rate does not stand far above this danger line. Though equal, probably, to that in other countries where the standard of living is similar, it is lower than that of the Balkans or eastern nations. In 1932 the number of live births per 1000 of the population was 23·4, and in 1933 21·5, while the corresponding death-rates were 17·9 and 14·6. Compared with 1929 the number of live births shows a decrease of 3·6 per 1000, but as there is also a decrease of 3·2 in the death-rate the real decrease in the population would only be 0·4. In Germany there was a decrease of 0·5, and except in Italy there has been a similar decrease in every other European country. Economic conditions are undoubtedly an important cause, but that there are other factors is shown by the fact that the birth-rate had fallen even in the richest classes of society. The problem is one which, like the *egyke* or one-child system which prevails among the peasants, can be overcome only by moral suasion.

As for the medical profession, the number of practitioners in Hungary is 9000 for a population of something more than 9,000,000, and in the present economic distress the country is unable, in the minister's view, to maintain so many. In rural districts, he said, there was 1 doctor to 900 inhabitants; in Budapest the rate was 1 per 300. Three hundred patients could not support a doctor and the minister believed it was necessary for the State to help the medical profession—not by limiting the number of new doctors to be trained, but by increasing the scope of medical work. Medical men should no longer be asked to do preventive work gratuitously, but new positions should be created for them; and they should be appointed to many positions now held by laymen; for example, in most villages at present there were lay coroners.

AN UNUSUAL PUNISHMENT

Last winter Dr. X, a military surgeon, attempted to induce abortion in a girl of 19, and she died of hæmorrhage due to the operation. Post mortem it was found that she was not pregnant at all, and that death was due entirely to clumsy malpraxis. A court martial in Debrecen sentenced him to 15 months' imprisonment, forbade him to practise medicine for two years, and ruled that he must undergo a thorough course in pathological anatomy and pass an examination in that subject before taking up his work again.

A MEDICAL DIRECTOR OF OPERA

The *Praxis Medici*, a Rumanian monthly medical journal, reports that Dr. Victor Papilian, professor of anatomy at the University of Cluj, the capital of Transylvania, has been appointed managing director of the Cluj opera. Prof. Papilian has not resigned his chair and for the present at least will fill both positions.

BRUSSELS

(FROM A CORRESPONDENT)

A BILL TO REGULATE THE SALE OF ALCOHOL

A CABINET crisis which has interrupted the parliamentary session in Belgium has delayed a discussion of the Bill on "Alcoholic Beverages," which bade fare to be interesting. The position is as follows: Under the existing legislation, beer or wine may be sold or drunk on the premises in all licensed establishments; but the sale of distilled beverages is forbidden in smaller quantities than 2 litres, and the drinking of it on the premises is never authorised. It is thus impossible, at the restaurant, to take a "fine" (liqueur) after dinner, though it is easy, on returning home, to take as much of it as one wishes. A Bill, due to parliamentary initiative, has been presented, which will grant to public establishments the retail sale of alcoholic beverages. This Bill has met with enthusiastic supporters and equally stubborn opposers. The medical profession as a whole are hostile to it, fearing its consequences upon the public health, but certain members of the profession and certain political groups are partial to it. The chances for the Bill are almost even, the attitude of the Government being as yet undecided.

THE LATE KING ALBERT

The Committee of the *Journées Médicales de Bruxelles*, under the leadership of its former presidents, have laid a wreath on the tomb of King Albert I., its protector and friend, in the crypt of Laeken, which had been especially opened for this ceremony by royal permission. This manifestation of loyalty to the dynasty had been organised for the very day fixed for the opening of the fourteenth session of the Congress of the Journées Médicales; the function, however, was cancelled because of the national mourning. When it took place it acquired a considerable importance owing to the presence of delegations from the Academy, the Medical Faculties, the Army Sanitation Corps, the Medical Federation, the principal medical institutions and organisations, the learned societies, and the medical press. The ceremony was short but moving. After the wreath had been placed on the royal tomb a minute of silence was observed, and for a short instant the thoughts of all dwelt on the memory of a great king.

BATHING AT OSTEND

The civic authorities of Ostend have granted the right of the sea-bathing on the sands to a private individual, who will thus be able to impose a tax on bathers and price upon cabin locations. Now the remarkable installation was seen in Ostend last year of the "Palais des Thermes," an ultra-modern, hydrotherapeutic establishment, laid out with much thought for comfort and elegance, comprising a large swimming-pool and a miniature sea-bath, while equipped also for the treatment of certain medical affections. The concessionaire declares himself wronged, as the town from which he holds his permit is exploiting the opportunities of its own bathing establishment. This he holds to be disloyal competition, and the case is engaging the law courts.

MEDICINE AND THE LAW

Forceps Left in Patient's Body

AN inquest was held at Southwark on August 2nd upon a woman in whose body a pair of surgical artery forceps, 5 inches long, had been left during an operation for appendicitis thirteen years earlier. Her appendix had been successfully removed in 1921, and there was evidence that thereafter she had been able to do her household duties and to travel without discomfort though she suffered from vague pains from time to time. She had undergone no operation since 1921. On July 16th of this year she was admitted to St. Giles's Hospital, Camberwell, suffering from abdominal symptoms; an X ray examination showed the presence of the forceps. An operation was then performed to remove the forceps, which had ulcerated their way through the intestines. The patient, who was 70 years old, died a few days later. The coroner, Mr. A. Douglas Cowburn, examined several medical witnesses as to the practice of checking instruments in the operating theatre. He was told that forceps were counted in groups of ten before use and were checked afterwards, the theatre sister being responsible. Summing up the evidence to the jury, Mr. Cowburn said that a blunder had been committed 13 years ago and the fact could not be ignored. He considered, however, that the surgeon who conducted the original operation in 1921 ought not to be held blameworthy in the circumstances. It was obvious that the instruments had been miscounted. A surgeon's task, remarked the coroner, was comparable to that of the commander of an army; he could not possibly supervise every detail without so prolonging the operation as to enhance the risk to the patient. The coroner's jury returned a verdict of death by misadventure, thus negativing any implication of criminal negligence on the part of the surgeon.

A lesser degree of negligence suffices to fix liability for damages in a civil action than is required to justify a sentence of punishment in criminal proceedings. In a civil action, indeed, it might be impossible to dispute that the leaving of forceps in a patient's body is prima-facie negligence. In the legal phrase *res ipsa loquitur*—though the task of removing every swab and forceps is not always so simple as lawyers may think. There would remain, of course, the usual difficulty for the plaintiff to fix the negligence upon a particular person. If the sister miscounts the instruments, is the surgeon liable? On the one side it is argued that the surgeon is responsible for the subordinates who act under his orders and that he must pay for their negligence. On the other side it is argued that a surgical operation is a matter of teamwork, the surgeon being deemed not the army commander but the colleague *primus inter pares*. A similar dispute has occurred where damages are claimed for burns caused by hot-water bottles. The issue is decided on the particular facts of each case and the judges have hardly had the chance to lay down a general rule. The hospital, it is well established, can escape liability by pleading that its only duty was to take reasonable care in appointing its medical staff. In Hillyer *v.* St. Bartholomew's Hospital, where this principle was laid down, Lord Justice Farwell observed that the nurses and carriers assisting at an operation cease for the time being to be the servants of the hospital "inasmuch as they take their orders during that period from the operating surgeon alone." The dictum seems to hint that the nurse's error is the surgeon's liability; but Lord Justice Kennedy made an exception for "purely ministerial or administrative duties," which words might possibly include the routine checking of instruments. Whatever the doubts as to the legal liability, all will be agreed that every possible step must be taken to eliminate the risk disclosed at the recent Southwark inquest. It is interesting to learn that a number of medical students attended the inquest and that the coroner was careful to show them the forceps as an object-lesson.

Diphtheria Patient leaves Hospital

William Simms, suffering from diphtheria, was admitted to the Tolworth Isolation Hospital. Three days later the night nurse found that he had disappeared. The facts were reported to the police who found him at his home in Surbiton. He was fined £1 at Kingston on August 9th for the offence of "exposing himself while suffering from a dangerous infectious disease without taking precautions against spreading it in a public place." The police, it appears, had forcibly to restrain him from embracing his wife. Simms explained to the magistrates that his wife was expecting a child and he was anxious to see her. The chairman reminded him that his conduct might have serious consequences to the health and even the life of his own people. Prosecuting counsel said that these proceedings under the Public Health Act were believed to be the first of their kind. Though not unprecedented, such cases are fortunately rare.

PANEL AND CONTRACT PRACTICE

A Survey of the Year

THE fifteenth annual report of the Ministry of Health contains the usual survey of insurance practice for the past year. The scope of compulsory insurance has remained unchanged. A warning is issued against paying contributions for relatives or others who may be working, but who are not employed within the meaning of the Act, in the hope of obtaining benefit in due course. The tendency to do this arises from the threefold benefits of health insurance, contributory pension, and unemployment insurance. Contributions so paid cannot be refunded. There have been two decisions of interest as to employment under the Act. House-to-house salesmen engaged by a firm selling vacuum cleaners and who were paid by commission were found to be employed under a contract of service and therefore insurable. Skippers of trawlers working from an east coast port are not employed by way of manual labour. Voluntary contributors continue to increase: 460,000 (398,000 men, 62,000 women), as compared with 420,000 (362,000 men, 58,000 women) in 1932.

DEPOSIT CONTRIBUTORS

The number remains in the neighbourhood of 230,000, there being a slight increase in the number of entrants and exits in 1933. The number of women is increasing, ten years ago the proportion was about one-third, now it is nearly one-half. There is a special section of deposit contributors to provide for persons unable by reason of *ill-health* to join an approved society. They receive the ordinary benefits of the Acts and are not limited to the amount standing to the credit of their individual accounts as in the case of ordinary deposit contributors. Their membership on Dec. 31st, 1933, was 6908, an increase of 103 over the previous year. Expenditure on benefits is necessarily heavy, but in spite of increasing membership the amount fell from £20,000 in 1932 to £18,500 in 1933. The reduction in rates paid to women would account for some of this, but the liberal use of the regional medical service has been a contributory cause; 434 cases were referred, and in 60 per cent. of the cases incapacity was confirmed.

REFERENCE TO REGIONAL MEDICAL OFFICERS

There were 503,254 references for advice as to incapacity for work in 1933, of which only 2485 came from doctors; 60 per cent. of them related to women. Those actually examined numbered 268,157 (last year 626,853). The number who required a final certificate before the date of examination was 139,170, and 94,127 did not attend for examination. Of the persons examined 188,693 were reported as incapable and 79,464 (just under 26 per cent.) as not incapable. The number of cases examined by the regional medical staff is less than half that of the previous year. It would appear therefore that the agitation against unnecessary references has borne fruit, and that societies are learning to discriminate which cases should be sent for another opinion. It is not impossible that some insurance doctors have tightened up their certification standards. Sixty-four appeals about incapacity for work were decided by referees appointed by the Minister.

EXTENT OF MEDICAL SERVICE

There were 15,500 doctors in insurance practice, medicine was supplied by about 10,000 chemists' shops, and insured persons entitled to medical benefit numbered 15,150,000. Medical benefit cost £8,420,000, £6,077,000 was paid to insurance doctors, £1,863,080 f the balance to insurance chemists. The remainder was allotted as follows: £203,000 to insurance octors on account of mileage, £196,000 to doctors for medicine and appliances, £63,900 on account of nsured persons taking benefit through approved nstitutions, nearly £9000 was set aside to enable ountry doctors to attend post-graduate courses, £7250 was paid on account of own arrangers.

There was an increase of nearly 6 per cent. in the number of insurance prescriptions dispensed as compared with 1932, rising from 56,081,507 to 59,338,504, the number of prescriptions per insured person increasing from 4·19 to 4·56. The average ingredient cost increased from 3·594 to 3·643 pence, and the total cost per insured person of drugs and appliances from 2*s.* 9½*d.* in 1932 to 2*s.* 11½*d.* in 1933. The increase is thought to be due to influenza early in the year. Referees decided during the year that virol was not a drug, that an arch support was an appliance within the meaning of the Act. The following additional appliances were made available as part of medical benefit: brushes and droppers when required for the proper administration of any drug forming part of medical benefit; lubricant for use with urethral catheters.

Of the 990 cases referred as to whether a particular service was within the range of medical benefit, the local medical committee agreed with the insurance committee that 49 were within the scope of the Act and that 941 were outside. Referees decided that four cases of psychotherapy fell outside the scope of the Act, the committees having disagreed on the subject.

Ethics and Contracts at Home and Abroad

"The term 'contract practice' is anathema to the vast majority of individual practitioners in this country," says the *Journal of the American Medical Association* (July 28th, p. 263); "yet . . . conceivably there are situations in which the practice of medicine under a contract may be necessary or desirable." The Association defines contract practice as:

> "the carrying out of an agreement between a physician or a group of physicians, as principals or agents, and a corporation, organization or individual, to furnish partial or full medical services to a group or class of individuals for a definite sum or a fixed rate per capita."

It recognises that such practice is not in itself unethical; "the decision as to its ethical or unethical nature must be based on the ultimate effect for good or ill on the people as a whole." Certain features or conditions may be introduced into its working which would be against the public good and therefore unethical from a professional standpoint. Instances of this are solicitation for patients, either by the corporation or by the practitioner; underbidding to secure the contract, which naturally leads to inadequate remuneration and eventually produces a poor medical service; and interference with reasonable competition in a community, which may prevent free choice of doctor—a condition which is one of the foundation principles of general practice.

The judicial council of the American Medical Association have now issued the following statement:

> "It is unprofessional for a physician to dispose of his professional attainments or services to any lay body, organization, group or individual, by whatever name called, or however organized, under terms or conditions which permit a direct profit from the fees, salary or compensation received to accrue to the lay body or individual employing him. Such a procedure is beneath the dignity of professional practice, is unfair competition with the profession at large, is harmful alike to the profession of medicine and the welfare of the people, and is against sound public policy."

In this country there is still a definite dislike of contract work, whether by medical men or by business firms. In business the remark may often be heard that such and such work was done by contract and so was hurried, or the best materials were not used; and elaborate precautions are almost always necessary to make certain that the terms of the contract are faithfully carried out. Even in this sphere, where possibilities of requirements and their costs are largely known, it does not always follow that the cost by contract will be less than it would have been by piecework performed under honest conditions. The contract is generally made in order to know the limit of financial liabilities, with the hope that at the same time the standard of work will be as good as if payment were being made for the actual work done.

When we come to medical contracts the profession is in a very much worse position than the business contractor. The contracting medical man does not know at all (under National Health Insurance for example) how much work he will be required to do. He does not even know what duties he may have to perform under his agreement, for more duties may be added without any corresponding addition to his remuneration. The same argument applies to other forms of medical contract work. A medical officer of health will have a terrific amount of work to do if an epidemic of small-pox occurs in his area, but his remuneration will not be increased one penny. The house surgeon who receives his £100 a year at some county hospital will not receive any more if he is called up every night in a week for emergency work than if he were able to stay in bed at rest. These unknown liabilities are in the terms of the contract and generally accepted by the profession, but what business men would undertake such liability? The doctor's position is not much better when he is under no employer, but has himself made a contract. The contract patient who demands his services may and often does urgently require them, but such patients are also very apt to make calls, for inadequate reasons, that would not be made if they had to pay for them.

Contract practice would be much more popular in the profession if it could in some way be protected against this sort of thing. Many patients could afford, say, 3*d.* for a bottle of medicine and provision could easily be made for those who could not afford it. If this had to be paid to the chemist by every insured person who required medicine the cost of drugs supplied would be greatly reduced, for only those who really wanted the medicine would then obtain it. So, too, emergency visits and night visits cause a wholly abnormal amount of wear and tear on the doctor's energy (to say nothing of his car), and he needs protection from them by some single-payment system. The present all-in capitation system of payment was chosen in the first instance by the profession because of its simplicity, but, human nature being what it is, it does give rise to apprehension by both doctors and patients that neither are obtaining a fair deal.

METROPOLITAN HOSPITAL SUNDAY FUND.—At a meeting of the council recently it was stated that the year's collections amounted to £61,000, a reduction of £3000 on the preceding twelve months; the broadcast appeal produced only £300 as against £900. The newly constituted ladies' committee will begin work in the autumn.

CORRESPONDENCE

THE "GAS WEDGE" IN THE ÆTIOLOGY OF FISTULA-IN-ANO

To the Editor of THE LANCET

SIR,—Fistula-in-ano has so long been described as "the result of abscess" that this theory of its causation has come to be accepted as fact. But why an abscess in this region should insist on opening both into the lumen of the bowel and on to the skin, and why it so frequently produces such tortuous and branched channels has not been very satisfactorily explained.

The following are references from recent editions of standard surgical works :—

> "Fistula-in-ano.—This term is somewhat loosely applied to all conditions in which suppurating tracts are found in the neighbourhood of the anus and the lower end of the rectum. Many of these are merely sinuses which have but one opening. Fistulæ are usually due to rectal or perirectal suppuration, but sometimes result from the ulceration of simple, syphilitic, malignant, stricture of the gut, the inner opening being either above, in the substance of, or below the stricture. This is more likely to be the case when the fistulæ are multiple."—Rose and Carless, "Manual of Surgery," 14th ed., 1933, p. 1229.
>
> "Perianal Fistula.—Fistula formation with perianal abscess as a rule only results if the abscess be allowed to burst. The fistula may end blindly internally, or may communicate with the anal canal below the external sphincter."—Russell Howard, "The Practice of Surgery," 4th ed., 1933, p. 819.
>
> "Fistula-in-ano (anorectal fistula) is a persistent, burrowing, and often tortuous sinus, the result of an unhealed abscess. Nearly one-third of all rectal cases are fistulas. (Tuttle.)"—Da Costa, "Modern Surgery," 10th ed., 1931, p. 1098.
>
> "The most frequent cause of a fistula about the anus is ischiorectal abscess."—Ashhurst, "Surgery Principles and Practice," 4th ed., 1931, p. 937.
>
> "A fistula is a suppurating tract opening both on to the cutaneous surface and into the lumen of the bowel. A sinus, on the other hand, has only one opening, which may either be on to the cutaneous surface, the cutaneous sinus, or into the lumen of the bowel, the rectal sinus. Both the sinus and the fistula when of rectal origin are always preceded by one or other variety of perirectal abscess."—H. S. Clogg in Choyce's "System of Surgery," 1932.

Having observed some cases in which fistula-in-ano developed without history or appearance of abscess, I was led to question the accepted statement, and I now believe that rectal flatus is the primary ætiological factor in producing these channels. Large quantities of gas collect in the lower bowel and are often held under considerable pressure. This acts in a manner similar to the air in an overcharged tyre with weakened outer cover, in which the inner tube protrudes in the areas lacking adequate support. Likewise in the anorectal section of the bowel the gas under pressure drives a protrusion in the line of least resistance. Each recurrence of this pressure advances the protrusion, so forming a channel into the tissue from the lumen of the bowel, a sinus. Obstacles may be met and so turn the course of the sinus as it progresses in the line of least resistance. Some resisting bands may so cross its path to cause it to branch. Such a sinus is open to invasion of infection and will act as a favourable incubator for the invading organisms, so it is not surprising that abscess is frequently associated with fistula-in-ano. The gas wedge continues to drive the protrusion to an outlet whether abscess has formed or not. The gas pressure is the vis a tergo.

Contributing causes can be found in factors which (1) tend to weaken the textural support to the bowel, and (2) those which favour increase of flatus. Both of these are prone to be more common in patients past 40, since there is a tendency then for more fat to be stored in the connective tissue so weakening the textural support which it offers, and the sedentary life, imposed at this age, fosters constipation and gas accumulation. Any ulceration of the bowel, by weakening it, may readily be the starting-point for the gas wedge to produce a fistula-in-ano.

I am, Sir, yours faithfully,

Harley-street, W., August 13th. R. YOUNG KENNY.

DOES THE PUNISHMENT FIT THE CRIME?

To the Editor of THE LANCET

SIR,—Yet another of those instances of sexual offences by elderly men has been published recently in the daily papers. Such offences are probably more common than is generally known as a certain number of the offenders contrive to sojourn abroad and so escape publicity. Many of such cases occur in men of great intellectual attainment who have spent useful lives in the public service, and their lapses are, in reality, due to periodic disordered impulses combined with failure of mental control. These offences are so repellent to all decent-minded individuals that the punishment inflicted appears to the man in the street to be scarcely adequate; but surely the medical man cannot regard with equanimity the spectacle of a poor old gentleman who has led a useful life being sent to prison because an enlarged prostate and arterial degeneration have led to an offence which with ordinary control he would never have committed. Naturally, one appreciates the difficulty in drawing the line, but this would appear to lie in the determination of loss of control.

Surely it is just as cruel and medieval to send paretic exhibitionists and arterio-degenerate delinquents to prison and disgrace as it once was to put lunatics in irons. An attendant or a mental home appears to be more suitable and would save much private and public distress.

I am, Sir, yours faithfully,
F. A. PHILLIPPS, M.D.

Lower Sloane-street, S.W., August 13th.

BUYING CENTRES

To the Editor of THE LANCET

SIR,—I am assuming that your correspondent, "A Visitor," intended his letter last week, under this heading, to be helpful to the buying centre at the Medical Section at British Industries House, but as more than one correspondent of mine is doubtful as to this, I wish to assure him and your readers that since the official opening of the House the attendance of potential buyers has been very satisfactory. On the day on which his letter was dated I enclosed for your information an exact list of those who visited the Section on July 30th. It will be seen that there were 13 persons, all of them connected with hospitals and five of them from abroad. This list is by no means exceptional. Every day there is a goodly number of serious inquirers and, what is even more to the point, the exhibitors are highly satisfied with the progress of affairs up to date, in a period which, it must be remembered, is the holiday season.

It must not be forgotten that the Medical Section is not a retail affair, but is intended to deal with wholesale buyers and those able to influence buying. There is a visitors' book which each visitor is invited to sign and which he may inspect if he so chooses. Every week a list of visitors with information as to their inquiries is sent to each tenant of the section.

Speaking as chairman of the Medical Advisory Council of the section I may say that my colleagues and I are in no way interested in the financial side of this enterprise (though obviously unless it succeeds on the financial side it cannot succeed on any other side), but we believe that there is a real need for a place at which hospital and institutional requisites can be seen and compared with as little trouble as possible, and that the directors of British Industries House have performed a service to our profession in opening this section. This opinion is fortified not only by the letter of your correspondent, and by the opinions expressed by visitors from all over the world, but also by the recent issue of the report of the committee of the Public Health Congress on Hospital Equipment. This influential committee strongly emphasises the need for standardisation of institutional requirements and the economies which could be effected by expert buying. It is obvious that the Medical Section at British Industries House should further both.

Medical men and all interested in hospitals and other medical institutions are cordially invited to visit the section.

I am, Sir, yours faithfully,

ALFRED COX,

Chairman, Medical Advisory Council.

British Industries House, Marble Arch, W., August 14th.

⁂ We know that our correspondent wished to be helpful, and we indicated, in a note to his letter, how well the use of the centre should meet many needs of medical institutions and individual doctors. The value of the centre should be widely recognised. The list, referred to as enclosed, is accurately summarised.—ED. L.

PITUITRIN FOR HERPES ZOSTER

To the Editor of THE LANCET

SIR,—I can lend support to Dr. Francis Gillett's account in your last issue (p. 307) of the effect of pituitrin on herpes zoster by reporting a case which I treated just two weeks ago. It was one of great severity involving two dorsal roots; the pain had been uninfluenced by barbiturates, opiates, salicylates, bromides, iodides, chloral, whole-blood injections, and by attempts to anæsthetise the nerves. On the eleventh day I gave an injection of 0·5 c.cm. pituitrin and the patient had his first restful night. Two days later a further injection was necessary, and after another 48 hours, as slight pains had recurred, an injection of Pitocin was given to determine whether the pressor factor was a necessary agent, as the disadvantages of pituitrin are obvious, whereas pitocin can be given with impunity. It is impossible to infer anything from my last injection as the illness was subsiding, but it would be interesting to try the effect of pitocin on an early case. The use of so small a dose of pituitrin per injection probably accounted for the less dramatic relief of pain in my case, probably also for the absence of the undesirable symptoms mentioned by Dr. Gillett.

I am, Sir, yours faithfully,

S. CHARLES LEWSEN.

College-crescent, London, N.W., August 14th.

INDUSTRIAL DERMATITIS

To the Editor of THE LANCET

SIR,—Dr. Arbour Stephens, in his letter in you last issue, raises once more the interesting questio of the relation between lowered bodily resistanc and the incidence of disease.

That dermatitis should occur in the physicall unfit is not a matter for surprise, as the surface hor cells—the natural protectors of the skin—share i the general state, and especially where food is scant (particularly in fats) or the diet unbalanced, thes cells are quick to suffer in function. It has bee observed that workers newly returned to work afte a period of unemployment seem particularl susceptible to industrial irritants. But this susceptibility from lowered resistance is not of course confine to dermatitis; it is true of other maladies, industria or not.

While agreeing with the general proposition, cannot, however, endorse Dr. Stephens' statemen that "in many if not most of the industries associate with the production of industrial dermatitis th workers are exposed to small quantities of carbo monoxide," nor have we proof of Dr. Stephens contention that industrial cancer occurs only amongs workers who have been exposed to the inhalation o CO gas over prolonged periods. On the contrary the experimental work of Argyll Campbell woul suggest the reverse.

I am, Sir, yours faithfully,

SIBYL HORNER.

Home Office, London, August 14th.

CORONARY THROMBOSIS AND AFTER

ANOTHER PERSONAL STORY

To the Editor of THE LANCET

SIR,—I found, for personal reasons (which intrude), the letter signed "Learn and Live" in TH LANCET last week very interesting and comforting I am 47 years of age. A year ago I disposed of m practice and took a post as ship surgeon. Of lat I had put on a great deal of weight; my friend twitted me, suggesting that after a few months o a ship I should need a crane to get off her. I was very heavy smoker.

On board I indulged in very strenuous exercise— deck tennis, running round the deck, and swimming I began to feel muddled in the head and develope slight pain in the chest. Both these things I ignore and continued my exercise. One night, after bein asleep for two hours, I woke up with an alarmin pain in my chest, which lasted about two hours. took things very easily for the next four days, bu attended to my work. On the fourth day a mos severe attack came on and lasted all night. Sinc then my history is the same as that narrated b "Learn and Live." In fact I was most interested t note the large psychological factor. I can wall miles, but going upstairs, an annoyance, or a competitive game (such as yacht racing), or feelin *compelled* to do anything, bring on pain at once. have reduced my weight to normal by careful dieting and taking no liquid at meal times. Nitrites d not ease the pain; I find two hours sleep in th afternoon keeps me free. The notes furnished b "Learn and Live" form quite the best account o coronary thrombosis I have read.

I am, Sir, yours faithfully,

August 13th. A. B. C.

OBITUARY

BERTRAM COLLINGWOOD, O.B.E., M.D. Camb.

PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF LONDON

We regret to announce the death of Prof. Collingwood which occurred in London on August 9th in the 64th year of his age.

Bertram James Collingwood was born in Sunderland in 1871, went to Caius College, Cambridge, as an undergraduate, in 1889, and took honours in the Natural Science Tripos in 1893. He proceeded then for his medical education to St. Mary's Hospital, and graduated as M.B., Ch.B. in his university in 1900, just previous to the outbreak of the South African war. In South Africa he did good service as a civil surgeon in connexion with the prevalence of typhoid fever which had such a disastrous effect on our forces, and at the conclusion of hostilities his bent towards physiological work was confirmed by his appointment as assistant to Prof. A. D. Waller, who was then working at the Imperial Institute in the physiological laboratory of the University of London, which owed its origin largely to his own efforts and the generosity of his family. The work with which Collingwood was first associated was an investigation into the various dangers of chloroform anæsthesia. Waller's researches following directly upon the report of the Hyderabad Chloroform Commission. These investigations showed the dangers not to depend so much on the total dose administered as on the percentage of vapour in the inhaled air, and Collingwood devised an apparatus for the delivery of chloroform vapour of known dilution with air, which was described in the *Transactions* of the Medico-Chururgical Society. In association with Waller he communicated to the *Journal of Physiology* papers on the respiratory quotient and carbonic acid estimation, while his individual papers to the same journal included articles upon chloroform apnœa and the absorption of chloroform in anæsthesia, and a description of an apparatus for recording respiration. He published also in the *Transactions* of the Medical Society of London a useful investigation into the ætiology of pulmonary emphysema.

PROF. COLLINGWOOD

[Photograph by Elliott & Fry

In 1904 Collingwood was appointed demonstrator in physiology at St. Mary's Hospital, a post which he filled until 1907, and during this time he proved himself to be a gifted teacher, while he continued his investigations along lines he had already made his own, as well as into other allied problems of the physiology of respiration. So that he had earned high recognition for physiological research when in 1909 he was appointed to the chair of physiology at University College, Dublin. The National University of Ireland had not long been founded, and the difficult task was imposed on all members of the medical staff to get level with the work of organisation essential to the new institution. Collingwood's share in this activity was especially onerous. He proved a stimulating and energetic teacher; his influence in the promotion of research was marked; his classes increased rapidly in size, while his tact and obvious goodwill made him popular with colleagues and students. He developed into a first-class teacher and displayed the qualities as lecturer and demonstrator which later became so conspicuous on his return to London.

Collingwood's services in the late war commenced in 1915 after the first gas attacks upon our troops. He became at once engaged on researches into antigas measures. These were undertaken originally at the R.A.M.C. laboratory, Millbank, but in 1916, with a commission as major in the R.A.M.C., he was appointed chemical adviser to the Irish Command; this position he held till the termination of hostilities, being not only unsparing in his endeavours to make a success of antigas training, but able to make valuable suggestions to the Chief Chemical Adviser of the Home Forces. After the armistice he was retained by the Command, became largely active in the organisation of the scientific side of the Army education scheme and was appointed O.B.E.

For a brief period he now returned to Dublin, but in 1920 he was appointed professor of physiology in the University of London with a chair at St. Mary's Hospital, the position which he was holding at his death. Here it was soon seen that the reputation as thinker, lecturer, and teacher which he had brought with him from Dublin was fully deserved, and he enhanced it by his work at St. Mary's. His teaching aimed always at the application of physiological principles to the treatment of disease, in accordance with the now generally accepted ideal of the medical curriculum, and his wide knowledge of physiology was manifested especially in his expositions of the chemistry of the body. His help and his criticisms were always available to those who worked under him, and, as he was both kind and tactful in rendering assistance to these, he was able to inspire among his fellow workers and his students a zeal for original research. Further, like his famous uncle, Lewis Carroll, he had a humorously whimsical side to him, and this was frequently apparent in his lectures to the considerable appreciation of his audiences. At St. Mary's he was instrumental in establishing the Waller research memorial to commemorate the life work of his old teacher and colleague, who himself had served on the educational staff of St. Mary's for 15 years. At the end of 1932 Collingwood used his influence as a lecturer in the United States in the service of St. Mary's, the object of the lectures being to raise funds for the establishment and endowment of the "Wonder" children's ward in the hospital. This ward is a memorial to Lewis Carroll.

Collingwood's communications to the *Journal of Physiology* of later years include papers in collaboration with H. L. F. Buswell on the tension of carbon dioxide in alveolar air and on chloroform narcosis, and some valuable researches concerning the calcium content of the blood and the influence of variations in its amount on coagulation. In the same journal, in collaboration with M. T. MacMahon, he wrote on anticoagulants of blood and on thrombrin and antithrombrin. To the *British Medical Journal* he communicated in collaboration with Sir William Willcox a paper on the use of alcohol vapour mixed with oxygen, a subject which he had discussed in the *Transactions* of the Royal Academy of Medicine in Ireland.

Prof. Collingwood married in 1917 Grace Jane Wilkinson, the daughter of Dr. C. Wilkinson, and leaves a widow and three children.

WILLIAM EDWARD COLLINS, C.M.G., M.B. Lond.

HON. CONSULTING SURGEON TO WELLINGTON HOSPITAL

Colonel the Hon. W. E. Collins, whose death was reported from New Zealand on Saturday, August 11th, at the age of 81, was particularly associated with the work of the New Zealand Red Cross Society, and his death will be regretted by all connected with the movement as well as by a large circle of friends.

Born at Monghyr, in India, in 1853, he was the son of the late Dr. J. G. Collins, of the East India Army, and received his early education at Cheltenham, afterwards proceeding to St. George's Hospital for his medical training. He qualified with the diploma of the Royal College of Surgeons in 1876, graduated M.B. Lond. in the following year, and in 1878 sailed for New Zealand, where, at Wellington, his zeal for his profession and his skill as a surgeon soon gained for him an extensive practice. He joined the New Zealand military forces in 1880, and the institution of the Volunteer Bearer Corps of the volunteer movement owed much to his initiative. During the late war he was given command of H.M. hospital ship *Mahino* on its first commission in 1915. Later he commanded the *Marana* in 1916 and in 1918. He received the C.M.G. in 1917, and retired the following year. He was chairman of the executive of the British Red Cross Society, to the work of which he was devoted and of which he was made an honorary life member two years ago in recognition of his great service to the cause. A member of the senate of New Zealand University since 1904 he was an examiner in surgery for three years, while he had been on the honorary staff of Wellington Hospital for 30 years and a consulting surgeon for nine years. In 1914 he was chairman of the special committee on syphilis which was set up by the Australian Medical Congress. He had been a member of the Legislative Council of New Zealand since 1907 and was appointed C.M.G. in 1917.

Keenly interested in all forms of athletics, cricket, and tennis, football specially appealed to him, and he played for England against Scotland in the Rugby games of 1874–5–6, and took part in the England *v.* Ireland contest during the last two years mentioned.

Colonel Collins married in 1886 Isabel Georgina, daughter of Dr. David Warren, of Melbourne, by whom he had one son and one daughter.

GEORGE ALEXANDER MOORHEAD, F.R.C.S.I., M.R.C.P.I., D.P.H.

We regret to record the death of Dr. Moorhead, of Tullamore, which occurred in Dublin on August 3rd in his seventy-ninth year. He had undergone a serious operation a few weeks before his death, and made a brave but unsuccessful struggle for recovery.

George Alexander Moorhead obtained his first medical qualifications at the age of 21 from the Irish Royal Colleges; in 1881 he became a Member of the Royal College of Physicians, and in 1893 a Fellow of the Royal College of Surgeons. He spent his whole professional life in his native town of Tullamore, where he was for many years dispensary medical officer and medical officer to the district hospital. He conducted a large practice for which, indeed, both by his attainments and by his natural capacity, he was well equipped. In 1907 he took the diploma of D.P.H. of the Royal Colleges, and as medical officer of health of Tullamore he was an active sanitarian, the many improvements in draining and housing in the town being due mainly to his initiative and work.

Apart from his profession, much of his leisure was spent in horse-breeding and racing and his stable produced some notable winners. Dr. Moorhead is survived by his wife and a large family of sons and daughters, of whom the eldest son is a member of the medical profession. His death will be felt in a wide circle of patients and friends.

THE LATE DR. ROBERT LAWS

Dr. Robert Laws, whose death we recorded with a summary of his work last week (see p. 318), played such a significant rôle in Central Africa that the following notes on his career, supplied by G. D. S., are welcome.

"Dr. Robert Laws, whose death in a London nursing-home from peritonitis occurred on August 6th, was one of the really great missionaries of modern times. For 52 years he laboured in Central Africa. He first went out in 1875 as medical officer with the original expeditionary party sent by the Free Church of Scotland to carry on the work of Livingstone, who had but recently died. Laws's boyhood's ambition was to follow in Livingstone's footsteps. And the mission which Laws founded and under whose wise and energetic direction it grew and flourished is world-known as the Livingstonia Mission.

"When Laws heard of the plan to establish a mission on the shores of Lake Nyasa he said 'This is the work I have been preparing for all my life.' It was the beginning of a new epoch for Central Africa, when he entered the waters of Nyasa on the little steamship *Ilala*—the first steamship to navigate any of the big lakes. The missionaries found a land all but ruined by constant tribal warfare as well as by the raids of Arab slavers. Their settlements and civilising influence paved the way for the entry of the British Government in 1891 and for a rapid growth of native prosperity, with the return of peace and the spread of Christian education. When Laws retired in 1928 he left behind him a prosperous and peaceful Christian community, numbering 20,000 church members (where 50 years before there had not been a single Christian), with nearly 700 schools, churches, thriving workshops, stores, farms and gardens, dispensaries, and a hospital.

"Laws's versatility, energy, and competence in all departments of pioneer life were almost incredible. He was not indeed a great preacher, but he was a fine schoolmaster and organiser. A skilful translator, he compiled the first dictionary, grammar, and New Testament in the Njanja tongue. He was a good seaman, an expert tracker of game, and incidentally an excellent cook. He thoroughly enjoyed the life of an explorer. He knew how best to establish friendly relations with the wildest of savages, was often peacemaker in their feuds, and many miserable slaves owed to him their release. For civil administration, too, he had talent, and for years many of the natives would recognise no other tax-gatherer than the doctor. His services as physician and surgeon were constantly in request.

"He devised an admirable system of book-keeping, was a good amateur printer, and organised a most efficient postal service. He became, moreover, an experienced and successful gardener and farmer, and to him Central Africa owes the introduction of many new foodstuffs and of improved breeds of stock and methods of afforestation. Much more than a 'Jack of all trades' he seemed master of all. As a carpenter, builder, and architect he excelled. He acquired and put into practice the elements of road engineering. At the age of 49, when on furlough, he entered as a student in a technical college to make himself proficient in electrical engineering. Later on, during his year at home as Moderator in the Scottish Church, he took a three months' medical course to gain the latest knowledge in this field.

"A graceful tribute to the work of Dr. Laws was paid by the Government of Nyasaland soon after his retirement, when it decided, in recognition of the service he had rendered to civilisation in the Protectorate, to rename Mount Nyamkhowa after him. Now it is Mount Laws, which stands 7000 ft. high, within the Livingstonia Mission estate and looks across Lake Nyasa to the Livingstone Range, which perpetuates the name of that other missionary who was Laws's hero and inspiration.

"Laws was married in 1879 at Blantyre, Nyasaland, to Miss Margaret Gray, who was his able and devoted helpmate until her death in 1931. Their only daughter, Miss Amelie Laws, is a graduate in medicine."

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following appointments have been made: Surg. Lts. H. J. Bennett to *Cyclops* and to *Ramillies;* and S. I. Ballard to *Ramillies* and to *Cyclops.*

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. H. G. Ungley to *Effingham.*

Surg. Lt. W. H. C. Watson to *Victory* for R.N.B.

Proby. Surg. Sub.-Lt. (D) A. C. Fuller to *Victory* for R.N. Hosp., Haslar.

ARMY MEDICAL SERVICES

Lt.-Col. R. P. Lewis, from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. R. A. Flood to be Lt.-Col.

The undermentioned Lts. (on prob.) are confirmed in their rank: M. S. W. Bisdee, P. O'Shea, R. W. Scott, and J. D. P. Macpherson.

Capt. E. G. Dalziel to be Maj.

Lt. (on prob.) M. W. Allen resigns his commn.

REGULAR ARMY RESERVE OF OFFICERS

The undermentioned, having attained the age limit of liability to recall, cease to belong to the Res. of Off.: Col. W. Bennett (late R.A.M.C.) and Col. L. Wood (late R.A.M.C.).

ARMY DENTAL CORPS

The undermentioned Lts. (on prob.) are confirmed in their rank: K. H. Coulton and J. E. C. Robinson.

TERRITORIAL ARMY

R. J. C. Hamilton (late Offr. Cadet, Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

O. R. L. L. Plunkett (late Cadet Lce.-Corpl., Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

INDIAN MEDICAL SERVICE

The following appointments are confirmed: Majs. B. R. Tandon, P. V. Karamchandani, and R. K. Misra.

Capts.: K. R. Sahgal, M. S. Gupta, A. N. Chopra, D. N. Chakravarti, S. Annaswami, T. B. Pahlajani, Assa Singh, R. R. Bakshi, B. D. Khurana, D. C. Chopra, Jaswant Singh, Sangham Lal, A. K. Gupta, V. Srinivasan, D. P. Mitra, T. D. Ahmad, M. Jafar, A. M. Chaudhuri, P. V. Bamford, H. D. R. Zscherpel, K. Jilani, J. R. Dogra, S. Narain, F. M. Khan, D. Datt, M. G. Saincher, B. L. Taneja, S. W. H. Askari, Hoe Min Sein, D. P. Nath, and H. H. Mahmood.

The undermentioned appointments are made: To be temp. Lts.: Mohan Lal Gujral, Baij Nath Bhandari, Mohan Singh, Mir Naeem Mahmood, Shaikh Sultan Alam, Beharilal Kapur, Des Raj Sharma, Partap Singh Bassalvi, Mohd. Muzaffar-ud-Din Chughtai, Ghulamahmad Niazmohammad Ahmadi, Prince Mohan Kaul, Amarendra Krishna Dev, Mohammad Akram, D. Satyanarayana Raju, Gurbuxsh Singh, and Balwant Singh Bindra.

The undermentioned officers retire: Lt.-Cols. K. S. Singh and T. F. Owens.

ROYAL AIR FORCE

Flight Lt. B. W. Cross is promoted to the rank of Squadron Leader.

Group Capt. E. C. Clements is placed on the retd. list.

RESERVE OF AIR FORCE OFFICERS

The undermentioned are granted commissions as Flying Officers in class DD: T. G. Hovenden and R. D. Bruce.

COLONIAL SERVICE

Dr. R. Austin has been appointed Medical Officer and District Officer, St. Vincent, and Dr. C. H. Parkin, Radiologist, Jamaica. Dr. J. L. Lochhead, late Medical Officer, Nigeria, becomes Medical Officer, Gambia, and Dr. J. M. Semple, Medical Officer, Zanzibar, Senior Medical Officer, Uganda.

DEATHS IN THE SERVICES

Col. Charles Robert Tyrrell, C.B., C.B.E., late R.A.M.C., who passed away in his sleep at Folkestone on August 12th at the age of 75, was a Middlesex man who qualified in 1881 with the membership of the Royal College of Surgeons of England and the licentiate of the Society of Apothecaries. He entered the Army in the following year, and in 1897–98 saw service on the North-West Frontier of India (despatches and medal with clasp). He retired in 1912, but was re-employed during the late war. From 1914 to 1917 he was at the War Office, and for one year afterwards was commissioner of medical services at the Ministry of National Service. Col. Tyrrell was made a Knight of Grace of the Order of St. John of Jerusalem in 1913, received the C.B. in 1917, and the C.B.E. two years later. In 1900 he married Agnes Laura, daughter of the late James Livesey, by whom he had one son.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 4TH, 1934

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 0; scarlet fever, 2400; diphtheria, 1088; enteric fever, 36; acute pneumonia (primary or influenzal), 438; puerperal fever, 46; puerperal pyrexia, 97; cerebro-spinal fever, 10; acute poliomyelitis, 16; acute polio-encephalitis, 1; encephalitis lethargica, 6; dysentery, 14; ophthalmia neonatorum, 107. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on August 13th–14th was as follows:—Small-pox, 0; scarlet fever, 1431; diphtheria, 1446; measles, 612 (last week 650); whooping-cough, 269; puerperal fever, 25 mothers (plus 6 babies); encephalitis lethargica, 268; poliomyelitis, 1; "other diseases," 243.* At St. Margaret's Hospital there were 22 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 13 (1) from measles, 9 (1) from scarlet fever, 13 (5) from whooping-cough, 39 (6) from diphtheria, 48 (18) from diarrhœa and enteritis under 2 years, and 8 (1) from influenza. The figures in parentheses are those for London itself.

Manchester and Sheffield each reported a death from enteric fever. Only three towns (Sunderland, Tynemouth, and Birmingham) had as many as 2 deaths from measles. Four fatal cases of diphtheria were reported from Liverpool. Liverpool, again with 5, showed the highest number of deaths from diarrhœa, Gillingham 3, no other large town more than 2.

The number of stillbirths notified during the week was 280 (corresponding to a rate of 41 per 1000 total births), including 49 in London.

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* Last week this figure should have been given as 247.

MEDICAL NEWS

University of Cambridge

On August 4th the following degrees were conferred:—

M.D.—C. G. H. Campbell, J. K. Monro, W. G. Oakley, B. C. Tate, K. H. Uttley, J. M. Graham, and A. W. Langford.

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"A graceful tribute to the work of Dr. Laws was paid by the Government of Nyasaland soon after his retirement, when it decided, in recognition of the service he had rendered to civilisation in the Protectorate, to rename Mount Nyamkhowa after him. Now it is Mount Laws, which stands 7000 ft. high, within the Livingstonia Mission estate and looks across Lake Nyasa to the Livingstone Range, which perpetuates the name of that other missionary who was Laws's hero and inspiration.

"Laws was married in 1879 at Blantyre, Nyasaland, to Miss Margaret Gray, who was his able and devoted helpmate until her death in 1931. Their only daughter, Miss Amelie Laws, is a graduate in medicine."

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following appointments have been made: Surg. Lts. H. J. Bennett to *Cyclops* and to *Ramillies*; and S. I. Ballard to *Ramillies* and to *Cyclops*.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. H. G. Ungley to *Effingham*.

Surg. Lt. W. H. C. Watson to *Victory* for R.N.B.

Proby. Surg. Sub.-Lt. (D) A. C. Fuller to *Victory* for R.N. Hosp., Haslar.

ARMY MEDICAL SERVICES

Lt.-Col. R. P. Lewis, from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. R. A. Flood to be Lt.-Col.

The undermentioned Lts. (on prob.) are confirmed in their rank: M. S. W. Bisdee, P. O'Shea, R. W. Scott, and J. D. P. Macpherson.

Capt. E. G. Dalziel to be Maj.

Lt. (on prob.) M. W. Allen resigns his commn.

REGULAR ARMY RESERVE OF OFFICERS

The undermentioned, having attained the age limit of liability to recall, cease to belong to the Res. of Off.: Col. W. Bennett (late R.A.M.C.) and Col. L. Wood (late R.A.M.C.).

ARMY DENTAL CORPS

The undermentioned Lts. (on prob.) are confirmed in their rank: K. H. Coulton and J. E. C. Robinson.

TERRITORIAL ARMY

R. J. C. Hamilton (late Offr. Cadet, Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

O. R. L. L. Plunkett (late Cadet Lce.-Corpl., Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

INDIAN MEDICAL SERVICE

The following appointments are confirmed: Majs. B. R. Tandon, P. V. Karamchandani, and R. K. Misra.

Capts.: K. R. Sahgal, M. S. Gupta, A. N. Chopra, D. N. Chakravarti, S. Annaswami, T. B. Pahlajani, Assa Singh, R. R. Bakshi, B. D. Khurana, D. C. Chopra, Jaswant Singh, Sangham Lal, A. K. Gupta, V. Srinivasan, D. P. Mitra, T. D. Ahmad, M. Jafar, A. M. Chaudhuri, P. V. Bamford, H. D. R. Zscherpel, K. Jilani, J. R. Dogra, S. Narain, F. M. Khan, D. Datt, M. G. Saincher, B. L. Taneja, S. W. H. Askari, Hoe Min Sein, D. P. Nath, and H. H. Mahmood.

The undermentioned appointments are made: To be temp. Lts.: Mohan Lal Gujral, Baij Nath Bhandari, Mohan Singh, Mir Naeem Mahmood, Shaikh Sultan Alam, Beharilal Kapur, Des Raj Sharma, Partap Singh Bassalvi, Mohd. Muzaffar-ud-Din Chughtai, Ghulamahmad Niazmohammad Ahmadi, Prince Mohan Kaul, Amarendra Krishna Dev, Mohammad Akram, D. Satyanarayana Raju, Gurbuxsh Singh, and Balwant Singh Bindra.

The undermentioned officers retire: Lt.-Cols. K. S. Singh and T. F. Owens.

ROYAL AIR FORCE

Flight Lt. B. W. Cross is promoted to the rank of Squadron Leader.

Group Capt. E. C. Clements is placed on the retd. list.

RESERVE OF AIR FORCE OFFICERS

The undermentioned are granted commissions as Flying Officers in class DD: T. G. Hovenden and R. D. Bruce.

COLONIAL SERVICE

Dr. R. Austin has been appointed Medical Officer and District Officer, St. Vincent, and Dr. C. H. Parkin, Radiologist, Jamaica. Dr. J. L. Lochhead, late Medical Officer, Nigeria, becomes Medical Officer, Gambia, and Dr. J. M. Semple, Medical Officer, Zanzibar, Senior Medical Officer, Uganda.

DEATHS IN THE SERVICES

Col. Charles Robert Tyrrell, C.B., C.B.E., late R.A.M.C., who passed away in his sleep at Folkestone on August 12th at the age of 75, was a Middlesex man who qualified in 1881 with the membership of the Royal College of Surgeons of England and the licentiate of the Society of Apothecaries. He entered the Army in the following year, and in 1897–98 saw service on the North-West Frontier of India (despatches and medal with clasp). He retired in 1912, but was re-employed during the late war. From 1914 to 1917 he was at the War Office, and for one year afterwards was commissioner of medical services at the Ministry of National Service. Col. Tyrrell was made a Knight of Grace of the Order of St. John of Jerusalem in 1913, received the C.B. in 1917, and the C.B.E. two years later. In 1900 he married Agnes Laura, daughter of the late James Livesey, by whom he had one son.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 4TH, 1934

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 0; scarlet fever, 2400; diphtheria, 1088; enteric fever, 36; acute pneumonia (primary or influenzal), 438; puerperal fever, 46; puerperal pyrexia, 97; cerebro-spinal fever, 10; acute poliomyelitis, 16; acute polio-encephalitis, 1; encephalitis lethargica, 6; dysentery, 14; ophthalmia neonatorum, 107. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on August 13th–14th was as follows:—Small-pox, 0; scarlet fev[illegible], 1446; measles, 542 (last week 650); [illegible] puerperal fever, 25 mothers (plus 6 ba[illegible] myelitis, 1; "other diseases," 243.* At [illegible] there were 22 babies (plus 8 mot[illegible] neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 13 (1) from measles, 9 (1) from scarlet fever, 13 (5) from whooping-cough, 39 (6) from diphtheria, 48 (18) from diarrhœa and enteritis under 2 years, and 8 (1) from influenza. The figures in parentheses are those for London itself.

Manchester and Sheffield each reported a death from enteric fever. Only three towns (Sunderland, Tynemouth, and [illegible] any as 2 deaths from measles. Four fatal [illegible] re reported from Liverpool. Liverpool, [illegible] the highest number of deaths from [illegible] no other large town more than 2.

The number of stillbirths notified during the week was 280 (corresponding to a rate of 41 per 1000 total births), including 49 in London.

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* Last week this figure should have been given as 247.

MEDICAL NEWS

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Appointments

Certifying Surgeons under the Factory and Workshop Acts: CURSHAM, A., L.R.C.P. Lond., M.R.C.S., Halesworth (Suffolk); FIDDIAN, G. V., M.B., B.Chir. Camb., Torrington, (Devon).

Vacancies

For further information refer to the advertisement columns

Aberdeen City Mental Hospital, Kingseat, Newmachar.—Asst. M.O. £300.

Altrincham General Hospital.—Sen. H.S. At rate of £150.

Birkenhead Municipal Hospital.—Deputy Med. Supt. £450. Also Res. M.O. £300.

Birmingham and Midland Eye Hospital.—Res. Surg. O. At rate of £130.

Birmingham Maternity Hospital.—Res. M.O. and Reg. £200.

Birmingham, Queen's Hospital.—Res. Med. Reg. £200. Res. Surg. O. £150. Also Res. Surg. Reg. £100.

Birmingham, Royal Cripples Hospital.—Res. H.S. At rate of £200.

Board of Control, Caxton House West, Tothill-street, S.W.—Commissioner. £840

[illegible] *l.*—H.S., and H.P. Each £100.

[illegible] *r Hospital.*—Jun. H.S. £150.

[illegible] *Hospital for Sick Children.*—H.S. £100.

Brighton, Royal Sussex County Hospital.—H.S. Also Cas. H.S. At rate of £150 and £120 respectively.

Cambric [illegible] *l.*—H.S. At rate of £130.

Cancer [illegible] *W.*—Asst. Radiologist. £350.

Canterb [illegible] *Hospital.*—H.P. At rate of £125.

Cardiff, Glan Ely Tuberculosis Hospital, Fairwater.—Asst. Tuberculosis M.O. £500. Two H.P.'s. Each at rate of £100.

Cardiff, King Edward VII. Welsh National Memorial Association. Three Asst. Tuber. O.'s. Each £250.

Cardiff, University College of South Wales and Monmouthshire.—Asst. Lecturer in Dept. of Physiology. £400.

Chester Royal Infirmary.—H.S. £150.

Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.

Cobham, Surrey, Schiff Home of Recovery.—Res. Surg. O. £200. [illegible] £120.

[illegible] M.O. £500.

[illegible] H.P. At

[illegible] H.S. Each at rate of £110.

Dudley, Guest Hospital.—Second H.S. £170.

Dumfries and Galloway Royal Infirmary.—Part-time Med. Supt.

East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £200.

Edinburgh, Royal College of Physicians.—Whole-time Fellowship, £300; Part-time Fellowship, £100.

Exeter, Royal Devon and Exeter Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.

Golden-square Throat, Nose and Ear Hospital, W.—H.S. £100.

Great Yarmouth Ger [illegible]

Halifax, St. Luke's [illegible] £250.

Hospital for Tropic [illegible] *W.C.*—H.P. At rate of £120.

Huddersfield Royal Infirmary.—H.S. At rate of £150.

Hull Royal Infirmary.—H.S. to Sutton Branch Hospital. At rate of £160.

Institute of Ray Therapy, &c., 152 Camden-road, N.W.—Part-time M.O. At rate of £100.

Lancaster, County Mental Hospital.—Asst. M.O. £500.

Leeds General Infirmary.—Hon. Orthopædic Surgeon.

Lincoln County Hospital.—H.S. At rate of £150.

Liverpool and District Hospital for Diseases of the Heart.—H.P. At rate of £100.

Liverpool Royal Infirmary.—Two H.S.'s to Spec. Depts. Each at rate of £60.

Liverpool, Royal Southern Hospital.—Res. Orthopædic H.S., M.O. to Spec. Dept., and Res. Anæsthetist. Each at rate of £60.

Macclesfield General Infirmary.—Second H.S. At rate of £150.

Manchester Babies Hospital, Burnage-lane, Levenshulme.—Sen. Res. Medical Officer. At rate of £125.

Manchester, Booth Hall Hospital.—Two Asst. M.O.'s. Each £200.

Manchester [illegible] *Diseases of the Throat and Ch*[illegible]

Manchester [illegible] Clinical Laboratory. £350.

Manchester, St. Mary's Hospitals.—Hon. Surgeon for Children's Dept.

Margate and District General Hospital.—Res. M.O. £150.

Middlesbrough, North Riding Infirmary.—Third H.S. At rate of £125.

Middlesex Hospital, W.—Radiologist. £500. Also Asst. Radiologist (Diagnostic). £100.

[illegible]—Two Surg. Regs. Each £250.

[illegible] *Hospital.*—Sen. Res. H.S. £300.

[illegible] *al Victoria Infirmary.*—Jun. Surg.

[illegible] *wich Hospital.*—Cas. O. and H.S. [illegible] pec. Depts. £120.

Poplar Hospital for Accidents, East India Dock-road, E.—Second Res. O. £175.

Port Elizabeth, Provincial and City Infectious Diseases Hospitals. Med. Supt. £1000.

Preston County Borough.—Asst. School M.O. £500.

Prince of Wales's General Hospital, N.—Res. Jun. H.P., and Two Res. Jun. H.S.'s. Each at rate of £90.

Princess Beatrice Hospital, Richmond-road, Earl's Court, S.W.—Res. M.O. At rate of £150. Also H.P. and Cas. O., H.S. and Cas. O. Each at rate of £110.

Queen Mary's Hospital for the East End, Stratford.—H.S.

Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. O. Each at rate of £100.

Reading, Royal Berkshire Hospital.—Res. Anæsthetist. At rate of £150.

Rhondda U.D.C.—Asst. M.O. £500.

Richmond, Surrey, Royal Hospital.—Jun. H.S. At rate of £100.

Royal Eye Hospital, St. George's Circus, Southwark, S.E.—H.S. and Asst. H.S. At rate of £150 and £100 respectively.

Royal London Ophthalmic Hospital, City-road, E.C.—Out-patient Officer. £100.

Royal Naval Medical Service.—Ten M.O.'s.

Royal Northern Hospital, Holloway, N.—Clin. Asst. for Aural Dept.

St. Albans and Mid Herts Hospital and Dispensary.—Res. H.S. £150.

St. Albans, Cell Barnes Colony.—H.P. £155–£165.

Sheffield Children's Hospital.—H.P. At rate of £100.

Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.

Stoke-on-Trent, [illegible] *Infirmary.*—H.S. and Asst. H.S.

Surrey County [illegible]

Swansea Count [illegible]

Swansea General and Eye Hospital.—Cas. O. At rate of £150.

Tilbury Hospital, Essex.—H.S. At rate of £140.

Walsall, Manor Hospital.—Jun. Res. Asst. M.O. £150.

Warwick, King Edward VII. Memorial Sanatorium, Hertford Hill.—Jun. Asst. M.O. £200.

Warwickshire and Coventry Joint Committee for Tuberculosis.—Asst. Tuber. O. £600.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

West Bromwich and District General Hospital.—H.S., H.P., and Cas. O. Each at rate of £200.

West London Hospital, Hammersmith-road, W.—H.P. Also 2 H.S.'s to Special Depts. Each at rate of £100.

Wigan, Royal Albert Edward Infirmary and Dispensary.—Hon. Asst. Surgeon.

Wrexham and East Denbighshire War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Fochabers (Morayshire), and at Manchester, W.C. (Lancs.).

Births, Marriages, and Deaths

BIRTHS

ANDERSON.—On August 12th, at St. John's Hill, Shrewsbury, the wife of Frederick A. Anderson, M.D., of a son.

MEAD.—On August 12th, at Victoria-road North, Southsea, the wife of Dr. Kenneth V. Mead, of a son.

TAYLOR-JONES.—On August 11th, at West Cross, Tenterden, Kent, the wife of Dr. T. H. E. Taylor-Jones, of a daughter.

DEATHS

COLLINGWOOD.—On August 9th, at Marlborough Hill, N.W., Bertram Ja[illegible] D., O.B.E., Professor of Physiology,

ELLIOTT.—On A[illegible] Shrubbery, Stoneygate, Leicester, Charles Coyne Elliott, M.D., F.R.C.S.E., aged 58 years.

HILL-WILSON.—On August 8th, after a long illness, Dr. A. E. [illegible] n, W.

LOW[illegible] s, Sussex, [illegible] P., aged 58, [illegible] uneral will leave 344, Finchley-road, Hampstead, Friday, August 17th, for the Liberal Jewish Cemetery, Pound-lane, at 10.30. No flowers by request. (American papers please copy.)

MASON.—On August 12th, at Oakwood, Walton-on-Thames, Arthur Henry Mason, M.R.C.S., L.R.C.P., aged 74.

MOORHEAD.—On August 3rd, at a nursing-home, Dublin, George A. Moorhead, F.R.C.S.I., of *Tullamore*, in his 79th year.

TYRRELL.—On August 12th, Charles Robert Tyrrell, C.B., C.B.E. (late R.A.M.C.).

WINTLE.—On August 8th, at Bath, Colston Wintle, M.R.C.S., L.R.C.P., J.P. for Bristol.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. I., 1934

THE Index and Title-page to Vol. I., 1934, which was completed with the issue of June 30th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

NOTES, COMMENTS, AND ABSTRACTS

"HEART" LATHAM

By Major Greenwood, D.Sc., F.R.C.P., F.R.S.
PROFESSOR OF EPIDEMIOLOGY AND VITAL STATISTICS IN THE UNIVERSITY OF LONDON, AT THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

"I was told," wrote Sir Thomas Watson, whose years and honours permitted him to use a freedom which in others *might* have been thought disrespectful, "by a profound classical scholar, who was possessed with the strange curiosity to read all the printed Harveian Orations, that subsequently to the date of Sir George Baker's, that by Dr. P. M. Latham was one of the very few the Latinity of which he could praise." [1]

Between Baker's oration (1761) and P. M. Latham's (1839) 24 Harveians were printed and one wonders whether that of Dr. John Latham (1794), Peter Mere Latham's father, was also one of the very few praiseworthy exercises in Latin prose. Ability to write decent Latin prose was one of the points in which Peter Mere Latham resembled another hero of the London College of Physicians, John Freind; some might think it the only point. What else could there be in common between the jolly, enjoying, English gentleman of the very early eighteenth century, who cracked his joke and his bottle, served in Spain with Peterborough, and was actually sent to the Tower, and the "very small, spare man . . . with an instinctive shrinking from remediless suffering, which, I remember hearing, led him sometimes to fail in keeping appointments for consultations in cases that were beyond hope, and this was perhaps an indication of one of the few defects in his character—a reluctance to encounter pain or to engage in struggle even when his convictions would have led him to do so." [2]

As I think I shall be able to show, there were other points of resemblance between the physician who died more than 200 years ago and the physician with whom men now living may have spoken.

Peter Mere Latham was born in 1789, the son of a physician who reached the highest rank in his profession and also lived to a venerable age. He was educated at Oxford and St. Bartholomew's Hospital, elected physician to the Middlesex Hospital in 1815 and to St. Bartholomew's Hospital in 1824 (when he resigned his office at the Middlesex Hospital). For the next 17 years he was an active, perhaps the most active, member of the Bart.'s staff, but in 1841 he resigned his office on account of ill-health, although he continued to practise in London for another 24 years, not retiring until 1865, when he was long past 70, and he survived until 1875, dying in the eighty-seventh year of his age. Those who are interested in such matters will remark a parallel between the careers of father and son. John Latham at the age of 46 in leading consulting practice "was worn out by the hard labour of his early success. He was believed to be consumptive, and he retired into the country, it was thought to die." (This and the following quotations are from a biography of John Latham by his son Peter.) "Under the influence of country air and complete relaxation from the cares and toils of professional business" John Latham recovered. He returned to London, moved from Bedford-row to Harley-street, "and here for years he enjoyed, with a more moderate practice, a larger share of health than he had known during the days of his greater labour and greater success." He did not in fact retire from practice until he was in his sixty-eighth year, and lived in retirement another 14 years. "He was singularly temperate, when temperance was hardly yet thought to be a virtue: he was most pure in life and conversation when to have been otherwise would have provoked no censure; and he was not ashamed to be religious when religion had yet no recommendation or countenance from the world."

"The son was also (I am now quoting from Munk, who derived his information from Peter Latham's pupil, Charles West) the Christian physician. Side by side with the pharmacopœia on his consulting room table, in the little book-stand, stood hidden in the plainest binding his Greek Testament and Bishop Andrews' 'Devotions,' and he loved them both." The father's physical weakness we have been told was a tendency to consumption, that of the son, "emphysema of the lungs and severe paroxysms of asthma." Should any of our medical psychologists go further into the family history of the Lathams, I cannot doubt but that very striking proofs of mutually incompatible hypotheses will easily be discovered.

WORKS AND OPINIONS

Peter Mere Latham's literary output was considerable. An edition of his works was edited for the New Sydenham by the late Robert Martin. The clinical lectures on diseases of the heart, which earned the nickname "Heart" Latham, were once popular in the profession. So far as the practice of competent physicians is concerned, in a large majority of the illnesses described by Latham the passage of 90 years has brought no fundamental change in methods of diagnosis or treatment. For that very reason his book is hopelessly obsolete; one can learn the facts better from books of to-day and there is not sufficient contrast between what was thought then and now either to flatter our vanity or to excite our antiquarian curiosity. The author's literary skill, although distinguished, is not distinguished enough to make him immortal on that account. In spite of the decay of what was once called humane learning, medical men of our own time, such as Osler and Allbutt, have written in the same vein as well as Latham.

It is, however, worth while to quote some passages of this book in order to illustrate Latham's medical philosophy. I take the following from his lectures on acute rheumatism.

> "Acute rheumatism has experienced strange things at the hands of medical men. No disease has been treated by such various and opposite methods. Venaesection has wrought its cure, and so has opium, and so has calomel, and so has colchicum, and so have drastic purgatives. I speak of these remedies in the sense which medical men imply when they talk (as they sometimes do) of this, that, or the other thing being their 'sheet anchor'; meaning that they rest upon it alone for the cure of the rheumatism, and employ other remedies either not at all, or for very subordinate purposes. And indeed I bear my testimony to the success of each of these different remedies, so far as that; under the use of each, I have seen patients *get* well. . . It is not possible that the treatment of disease shall be ever set at rest by the consent of physicians, or that fixed and uniform plans and remedies shall ever be adopted in cases bearing the same *nosological* name and character. At least it cannot be until each disease has its own specific antidote, or until each has

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[1] This, and other quotations not separately specified, is from the New Sydenham Society's Edition of Latham's Works.

[2] Munk's Roll of the Royal College of Physicians, vol. iii., p. 188.

disclosed some seminal principle from which it springs, and shown where it is: some principle, too, it must be which is within reach, and which is destructible and easily destroyed. . . For the treatment of acute rheumatism, above all other diseases which can be named, is a thing to put the physician and medicine itself to the trial of what they can really do. Here are no specifics at hand. All proceeds upon rational calculations; upon the right choice of purposes to be fulfilled, and the right choice of means to fulfil them. . . Let me repeat my testimony to the success of this practice in acute rheumatism; the practice, namely, of choosing some single indication, and steadily pursuing it to its fulfilment. It is a very rational practice. . . . Well, then, I am persuaded that when the physician is called upon to perform great things, even to arrest destructive disease, and to save life, his skill in wielding the implements of his art rests mainly upon the right understanding of simple and single indications, and of the remedies which have the power to fulfil them. To know that, in any case of acute rheumatism, the cure of the entire disease is accessible through the blood-vessels alone, by subduing their too forcible action; or accessible through the nervous system alone, by moderating its disquietude, and abating pain; or accessible through the stomach and bowels and liver alone, by stimulating them to a very large amount of secretions: and to know, moreover, that in any cases venaesection alone will fulfil the first purpose, or opium alone will fulfil the second, or calomel and aperients alone will fulfil the third: to know all this is the best preliminary step towards enabling us to deal safely and successfully with other and more numerous cases, which need a more complex method of treatment, and require that all these important purposes be pursued simultaneously, and all these great remedies be made confederate for the cure of the disease."

It will be seen that Latham's philosophy was essentially pragmatic. He had no more use than Freind for any subtle disquisition on the essential nature of a "disease." He flourishes a little over the "seminal principle of diseases" (meaning, no doubt, the *causa efficiens*, or biological excitant of an illness) and holds that the "highest office of medicine is to minister to diseases (again meaning illnesses) which by themselves, or by their incidence, go directly and rapidly to the destruction of life." Actually he is doing what all physicians must, in 90 per cent. of cases, do, treating symptoms, taking events as they come, and—this is what distinguishes the genuine physician from the charlatan—not pretending to himself that he is doing anything more.

THE CHANGES OF A CENTURY

Anybody who thinks that in 1933 physicians do much better need only refer to any modern treatise. Take, for instance, Strümpell and Seyfarth's "Practice of Medicine"[3]; it will be found that the passage of 80 years has not led to any fundamental change in the conception of acute rheumatism from the clinical aspect. In respect of treatment, shortly after Latham's death a new specific medication replaced colchicum —viz., salicylic acid—which, as sodium salicylate, had a considerable vogue, but owing to its production of some disagreeable symptoms has been to a great extent replaced by acetyl salicylic acid (aspirin) while the latter has again been replaced in some clinics by phenyl-quinolin carbonate (atophan). These remedies usually, it is said, cause the symptoms to disappear, but—

> "it is only in the minority of cases that the course of the disease is at an end. There very frequently occurs, sooner or later, a relapse, with renewed pain or even effusion in one or more of the joints. . . It is an unfortunate fact that the efficacy of all remedies against acute rheumatism is limited. . . Much discussion has taken place on the possible influence of salicylic preparations and atophan upon the occurrence of complications, especially cardiac lesions. At any rate, it is certain that the latter cannot be prevented by these remedies and quite often make their appearance during the administration."

So far as treatment is concerned the physician of 1934 can relieve pain more frequently than the physician of 1844, that he can "cure" the disease more frequently does not appear. This is a simple illustration not buried in technicalities; the principle it illustrates is a general one.

Those who assert that there are no forms of illness which the pure *medical* clinician can diagnose and treat more efficiently than his great grandfather are simply liars or ignoramuses. Were they to confine themselves to saying that in seven out of ten cases of the *kind* of acute bodily illness which leads to the calling in of a Fellow of the College of Physicians in 1933, he can do nothing essentially different from what Latham would have done 100 years ago, they would be within the mark.

From this one does not, unless very unintelligent, conclude that in 70 per cent. of cases the visit of a physician is useless now and was useless a century ago. Latham explained his duty:

> "According to popular notion, cure is the aim and end of all treatment, and the result and complement of successful treatment. But let cure and treatment now be taken to denote different things, so far as the aims and objects of the physician are concerned in his management of disease. Let cure be looked upon as concerned with the disease as such, and having little or no regard to the individual patient whom it befalls. Treatment is concerned with the individual patient, and leaves his disease to take care of itself. . . It is an instructive fact that, as the knowledge of disease has increased, the practice of medicine has been less and less conversant with cures and more and more conversant with treatment. . . And thus the present state of our knowledge has come to warrant the conclusion that the number of diseases is very small which are capable of cure by a proper remedy of their own, and which exclude the need of other remedies addressed to conditions belonging to the individual patients; whereas the number in which the converse obtains would embrace the vast majority of human maladies."

The physician is valuable not because of his grasp of general principles, but because of his nice observation of particular idiosyncrasies of human beings.

It is in his insistence upon this aspect of medicine that Latham becomes I will not say modern but very relevant to modern matters of controversy. He was an unsparing critic of medical education. In early middle life, in the lectures he published in 1836, he devoted much attention to the subject. It was the theme of his latest writing, published in the *British Medical Journal* in 1864, when he was 75. In 1836 Latham wrote:

> "Depend upon it, what all men indiscriminately are told they *ought* to know, all men indiscriminately will soon *pretend* to know, be it never so extravagant; and when every medical man in every town and village throughout England, be he physician, surgeon or apothecary, shall, in right of his profession, claim the homage due to vast learning and science, there will not be wanting some Molière or Le Sage to hold us all up to the just ridicule of mankind."

Twenty-eight years later he begins his article with these words:—

> "'Science is his forte, omniscience is his foible.' This was spoken by one well able to instruct mankind; and with such a lucky way of doing it, that he could wrap up wisdom in a witticism. And this was one of the wisest and wittiest things he ever said. He aimed at some individual, and perhaps hit him and made him smart. Had he aimed at our profession, would he have hit it?

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[3] English translation by C. F. Marshall and C. M. Ottley, London, 1931, vol. ii., pp. 1265 et seq.

STUDENTS' GUIDE—SESSION 1934-1935

THE GENERAL MEDICAL COUNCIL

POWERS, DUTIES, AND CONSTITUTION

THE General Council of Medical Education and Registration of the United Kingdom is, first, a registering body: no person, even though his qualifications have been obtained by examination, is a *legally qualified* medical practitioner until his name appears on the Medical Register. Secondly, it is a standardising body, ensuring that there is a definite minimum of medical education and scientific examination. Thirdly, it is a penal and disciplinary body, having power to remove from the Register any practitioner convicted of felony or misdemeanour or adjudged guilty of professional misconduct. Fourthly, to the Council is committed the codification of pharmaceutical remedies. The duties of the Council are thus primarily of a public nature, and its construction shows its fitness for its fourfold responsibilities.

The Council consists of 39 members, of whom 18 are appointed by universities and 9 by licensing corporations; 5 members are chosen by the Crown on the advice of the Privy Council, and 7 others are elected by the members of the medical profession as Direct Representatives. The Crown members and the university representatives need not be medical men, and one layman appointed by the Privy Council now sits on the Council. Three members are appointed for dental business by the Privy Council under the Dentists Act, 1921, under which the powers and duties of the General Medical Council with regard to the keeping of the Dentists Register and the administration of the Dentists Acts were largely transferred to the Dental Board of the United Kingdom.

The Educational Curriculum

Professional Education.—The course of professional study after registration as a student occupies at least five years. The Final Examination in Medicine, Surgery, and Midwifery must not be passed before the close of the fifth academic year of medical study.

REGISTRATION OF MEDICAL STUDENTS

Before registration as a student every candidate must produce evidence that (*a*) he has attained the age of 17 years; (*b*) that he has passed a recognised examination in general education; and (*c*) that, *in addition thereto*, he has passed, or obtained exemption from, an examination, theoretical and practical, in elementary physics and elementary chemistry conducted or recognised by a licensing body. The standard of General Education required is approximately that of University Matriculation or entrance examination in the Faculties of Arts or Pure Science. Examinations, other than Matriculation, must be of the standard prescribed in Section 2 of the Regulations below.

An approved course of instruction in elementary biology at a secondary school or other teaching institution recognised by a licensing body may admit a student to the professional examination in elementary biology upon registration as a medical student. The student should in every case write beforehand to the Body whose qualification he desires to obtain, and, although it is not necessary to pass in Biology before registration as a student, application should be made at the same time to the Body selected to ascertain their requirements.

The candidate commencing medical study should apply to the registrar of the division of Great Britain and Ireland in which he is residing, according to a prescribed form copies of which may be had on application to the several licensing bodies, medical schools, and hospitals, or at the offices of the Council; and should produce proof that he, or she, has fulfilled the first three conditions.

MAINTENANCE OF REGISTER OF MEDICAL STUDENTS

1. The Education Committee prepares and issues from time to time a list of examining bodies whose examinations in general education fulfil the conditions of, and are recognised by, the Council.

2. The Council has recognised the undernoted university examinations which are conducted in Great Britain and admit to the Faculties of Arts or Pure Science, or to other Faculties, subject to the conditions specified below:—

Oxford University, Responsions; Cambridge University, The Previous Examination. The Matriculation Examinations of the following Universities: Birmingham, Bristol, Durham, Leeds, Liverpool, London, Victoria of Manchester, Sheffield and Wales, and the Entrance or Preliminary Examination of the Universities of Scotland.

The condition prescribed by the Council in Faculties other than Arts or Pure Science is that:—

The certificate shall bear evidence that the candidate has passed at the Matriculation or Entrance standard in the following subjects, viz.: (*a*) English. (*b*) Mathematics, Elementary. (*c*) A language other than English. (*d*) *A fourth subject, as defined in the regulations of the* particular Examination, to be chosen from the subjoined list, viz.: History, Geography, Physical Science, Natural Science, Botany; Latin, Greek, Hebrew, French, German, or other language accepted by the University.

3. Subject to the condition prescribed above (Section 2), the Council will recognise those of the examinations conducted by recognised authorities in Great Britain which are accepted by any one or more of the above-named Universities as equivalent (under prescribed conditions as to "credits" or "grades"), for purposes of Entrance or Matriculation, to an Examination named in the preceding list (Section 2). In School or Leaving Certificates, the four required subjects must have been obtained at not more than *two* sittings. Such Examinations are:—

Bristol University: Higher School Certificate Examination; School Certificate Examination. Cambridge Local Examinations Syndicate: Higher School Certificate Examination; School Certificate Examination. Central Welsh Examination Board: Higher Certificate Examination; School Certificate Examination. Durham University: Higher Certificate Examination; School Certificate Examination. London University: Higher School Certificate Examination; General School Examination. Northern Universities Joint Matriculation Board: Higher Certificate Examination; School Certificate Examination. Oxford and Cambridge Schools Examination Board: Higher Certificate Examination; School Certificate Examination. Oxford Delegacy for Local Examinations: Higher School Certificate Examination; School Certificate Examination. Scottish Education Department: Leaving Certificate Examination.

4. The Council will continue to recognise certain Examinations conducted by Educational Bodies, other than those (mentioned in Section 3) whose Examinations are accepted by any one or more of the Universities of Great Britain. Recognition will not be extended under this Section to any Examination unless the Council is satisfied (*a*) that in scope and standard it is equivalent to a recognised Matriculation or Entrance Examination of a University of Great Britain, (*b*) that it fulfills the condition prescribed by the Council (Section 2), and (*c*) that the Examination has been completed at not more than two sittings. Such Examinations are:—

The College of Preceptors (England): Senior Certificate (with *credit*). The Educational Institute of Scotland: Preliminary Medical Certificate.

5. Subject to the prescribed condition (*Section 2*), the Council will recognise the Entrance Examination to the School of Physic of the University of Dublin, and the Matriculation or Entrance Examinations of the National University of Ireland, the Queen's University of Belfast, the Irish Royal Colleges of Physicians

and Surgeons; and also the Senior Grade or Leaving Certificate of the Department of Education of the Irish Free State, the Senior Certificate Examination of the Ministry of Education of Northern Ireland, and all examinations accepted by any one or more of the Universities of Great Britain or Ireland, as equivalent, for purposes of entrance or matriculation, to the above-named University Examinations.

6. Subject to the prescribed condition (Section 2), the Council will recognise all Examinations of Colonial or Foreign Universities which are accepted by any one or more of the Universities of Great Britain as equivalent, for purposes of entrance or matriculation, to an examination named in the list of examinations recognised by the Council (Section 2).

7. The Council will recognise the Final Examinations for Degrees in Arts or Science of any University of Great Britain or Ireland or of the British Dominions.

8. The registration of medical students shall be placed under the charge of the Branch Registrars.

9. Each of the Branch Registrars shall keep a register of medical students.

10. The Branch Registrar shall enter the student's name and particulars in the Students Register, and give him a certificate of such registration.

11. Each of the Branch Registrars shall supply to the several licensing bodies, medical schools, and hospitals, in that part of Great Britain or Ireland of which he is Registrar, blank forms of application for the registration of medical students.

12. A copy of the Medical Students Register prepared by each of the Branch Registrars shall be transmitted, on or before Dec. 31st in each year, to the Registrar of the General Council, who will distribute the list to the licensing bodies, medical schools, and hospitals.

All applications for special exceptions to the foregoing regulations as to registration shall be addressed to the Registrar of the General Council, and shall be decided by authority of the Education Committee, who shall report thereon to the Council.

MEDICAL SCHOOLS AND COLLEGES

The Universities, including their Colleges and Medical Schools, and Schools of Medicine at which Medical Study may be commenced in the United Kingdom are set out seriatim in the following pages.

Medical Registration in Ireland

By legislative agreement between the Governments of Great Britain, of the Irish Free State, and of Northern Ireland—the powers and duties of the General Council of Medical Registration and Education are continued as heretofore in respect of qualifying bodies in the Irish Free State, and of medical practitioners qualified in the Irish Free State. Side by side with this a Medical Council has been set up in the Irish Free State with the duty of establishing and controlling a Register for the Irish Free State. Practitioners whose names are on the General Register, and persons who pass a qualifying examination in the Irish Free State, will be registered on the Irish Free State Register on payment of the prescribed fee. The Irish Free State Medical Council have, over those whose names are on the Irish Free State Register, the same disciplinary powers as are possessed by the General Council over those whose names are on the General Register. To possess the privileges of a qualified practitioner in the Irish Free State it is necessary to be registered in the Irish Free State Register.

The net result of the change in the law as regards the practitioner qualifying in the Irish Free State in the future is that: (1) if he intends to practise only in the Irish Free State he need only register in the Irish Free State Register; (2) if he intends to practise in Great Britain he will register in the General Register; and (3) if he is in doubt where he will practise he will register in both Registers. He will, as he registers in one Register, or in both Registers, put himself under the disciplinary control of the one Council or of both Councils. No practical inconvenience is caused, and practitioners qualified in the Irish Free State in future will not find themselves deprived of any former privileges or rights.

Dental Board of the United Kingdom

Anyone who is on the Medical Register is entitled to practise as a dentist, although he cannot register as such without a degree or licence in dentistry; but it is a distinct advantage to take a special dental qualification, otherwise few dental appointments at general or special hospitals or dispensaries are available, and, unless the practitioner is on the Dentists Register, no work can be undertaken under the National Health Insurance (Dental Benefit) Regulations.

Under the Dentists Act, 1921, the powers and duties of the General Medical Council under the Dentists Act, 1878, and under the Medical Act, 1886, which related to the keeping of the Dentists Register and the administration of the Dentists Acts were largely transferred to the then newly constituted Dental Board of the United Kingdom. The registration of dental students at the commencement of their dental studies, and the power to erase a name from the Dentists Register, remain with the Council, but the inquiry into disciplinary cases rests with the Board, upon whose findings the Council acts.

The Dental Board consists of a chairman and 12 members. The chairman is appointed by the Privy Council. Other members of the Board are appointed by the Minister of Health, the Department of Health for Scotland, the Governor of Northern Ireland, the General Medical Council (3), four members are elected as representatives by the dentists possessing degrees or Licentiate in Dentistry and practising in England and Wales, Scotland, and Ireland, and two by dentists registered under the Dentists Act, 1921.

REGISTRATION OF DENTAL STUDENTS

The General Medical Council's Regulations in regard to the registration of dental students have recently been revised. The new regulations came into force on Oct. 2nd, 1933, and provide that the registration of dental students shall be carried on at the General Medical Council Office in London, in the same manner as that of medical students, and be subject to the same regulations as regards age and preliminary examinations; but professional study may commence either at a recognised dental hospital or school, or by pupilage with a registered dental practitioner.

Candidates for a diploma in dental surgery should produce certificates of having been engaged for at least four years in professional studies, and of having received during 24 calendar months instruction in dental mechanics. It is recommended that instruction in dental mechanics be taken at a recognised dental hospital and school. If any part of such instruction be taken by the candidate as a pupil with a registered dental practitioner, the time required to be devoted to it shall be at least twice the time required for the corresponding instruction taken at a dental school. Two years' bona-fide apprenticeship with a registered dental practitioner, after registration as a dental student, may be counted as one of the four years of professional study. When a student can show evidence of regular pupilage for not less that two years in dental mechanics to a registered dentist, prior to the passing of the prescribed preliminary and scientific examinations, he may antedate his registration for a period not exceeding one year prior to the passing of these examinations.

Offices

The address of the Registrar, to whom further communications should be addressed, is as follows: The Registrar of the General Medical Council, 44, Hallam-street, Portland-place, London, W.1. The offices of the Dental Board are at the same address.

A memorandum on the procedure to be adopted by those who desire to enter the profession of medicine, with notes on costs and prospects, and a similar memorandum in regard to dentistry, may be obtained on payment of 1s. each.

MEDICAL EXAMINING BODIES AND SCHOOLS IN ENGLAND AND WALES *

UNIVERSITY OF OXFORD

THERE are two degrees in Medicine, *B.M.* and *D.M.*, two in Surgery, *B.Ch.* and *M.Ch.*, and a diploma in *Ophthalmology.* The examinations are open to men and women alike.

Only Graduates in Arts of the University are eligible for the Medical and Surgical degrees. The most convenient course for the B.A. degree for intending graduates in Medicine is to take Responsions, the Preliminary Science Examinations mentioned below, and the Final Honour School of Animal Physiology.

To obtain the degrees of B.M. and B.Ch. the following examinations must be passed: 1. Preliminary subjects: Physics and Chemistry, Zoology, and Botany. 2. Professional. (*a*) First Examination: Subjects—Organic Chemistry, unless the candidate has satisfied the examiners in Part I. Chemistry in the Honour School of Natural Science; Human Physiology, unless he has obtained a First or Second Class in Animal Physiology in the Honour School of Natural Science; Human Anatomy. (*b*) Second Examination: Subjects—Medicine, Surgery, Midwifery, Pathology, Forensic Medicine and Public Health, Materia Medica and Pharmacology. The First and Second Professional examinations are held in June and December. The First B.M. Examination may be passed at any time after the Preliminary Scientific examinations. Anatomy and Physiology must be passed at the same time—Organic Chemistry may be taken separately.

At any time after passing *First B.M. Examination*, the candidate can, on producing certain certificates, present himself for examination in the subjects of Pathology, Forensic Medicine and Public Health, Materia Medica and Pharmacology; but cannot, unless he is already a registered medical practitioner, enter for Examination in Medicine, Surgery, and Midwifery, until the eighteenth term from his matriculation, nor until a period of at least thirty-three months has elapsed from the date of passing the First B.M. Examination. He must pass in Medicine, Surgery, and Midwifery at one and the same time.

Before admission to the Examinations in Pathology and Bacteriology, and Materia Medica and Pharmacology, of the *Second B.M. Examination*, the student must produce certificates of having attended courses of instruction including practical work in Pathology, Bacteriology, Post-mortem Clerking, and Pharmacology, either in Oxford or in another recognised Medical School. Before admission to the remainder of the Second B.M. Examination, he must produce a number of other certificates, including evidence of having acted as Clinical Clerk and Dresser, each for six months in the Wards, of instruction in Midwifery and of attendance on Labours, of instruction in Infectious Diseases and in Ophthalmology, of proficiency in Vaccination and in the administration of Anæsthetics, and of three academic years of hospital practice.

The degree of Bachelor of Surgery (B.Ch.) is granted with that of B.M. after passing the above examinations.

The degree of Doctor of Medicine (D.M.) is granted to Bachelors of Medicine of the University who have entered upon their thirtieth term from Matriculation, and have submitted a dissertation which is approved by judges appointed for the purpose by the Board of the Faculty of Medicine. The degree of Master of Surgery (M.Ch.) is granted after examination to Bachelors of Surgery who have entered upon their twenty-first term, and who are members of the surgical staff of a recognised hospital, or have acted as dresser or house surgeon in such a hospital for a period of six months. The examination, which includes Surgery, Surgical Anatomy and Pathology and Surgical Operations, is held annually in June, after the Second B.M. Examination.

Travelling Fellowship, Scholarships, and Prizes.—A Radcliffe Travelling Fellowship is awarded annually after an examination held in February. It is tenable for two years and of the annual value of £300. The examination is in Physiology, Pathology, and Hygiene, and is partly "practical." Candidates must be graduates in Medicine of the University. The holder must travel abroad for the purpose of medical study. Application should be made to the Radcliffe Examiners, Department of Medicine, University Museum. A Schorstein Research Fellowship of the value of £200 a year, tenable for two years, is offered in alternate years. Candidates must be graduates of the University, under 35 years of age, and must hold a registrable medical qualification. Their research must be carried out in one of the Medical Departments at Oxford. A Christopher Welch Scholarship of usually £200, tenable for four years, is awarded annually after examination. Candidates must be men undergraduate members of the University, who have not exceeded the twelfth term from their matriculation, or been admitted to any degree in the University. They may offer any one of the subjects, Animal Physiology, Botany, Zoology. A George Herbert Hunt Travelling Scholarship of the value of about £100 is awarded every second year to enable a Bachelor of Medicine to undertake three months' study abroad. A Rolleston Memorial Prize is awarded once in two years to members of the Universities of Oxford and Cambridge of not more than ten years' standing for an original research in some Biological subject, including Physiology or Pathology. The Radcliffe Prize, founded by University College (1907), is of the value of £50 and is awarded biennially (alternating with the Rolleston Memorial Prize) for research in some branch of medical science. The Theodore Williams Scholarships are awarded annually in the subjects of Anatomy, Physiology, and Pathology; the two first are of the value of £50 a year for two years, the last of the value of £60 a year for two years. A Radcliffe Scholarship in Pharmacology, of the value of £50 for one year, is awarded annually by the Master and Fellows of University College. Scholarships at certain London hospital medical schools are awarded each year on the nomination of the Regius Professor of Medicine or of the Dean of the Medical School. The Scholarships and Exhibitions in Science which are offered by most Colleges are open to those who intend to pursue Medicine. The value of these scholarships varies, according to the candidate's need, between £30 and £100 a year; the exhibitions vary in value from £30 to £80 per annum. The number of scholarships and exhibitions in Science offered annually is about forty. There are also Medical Scholarships of the value of £100 a year at University College and at Pembroke College. The Welsh Memorial Prize for Anatomical drawing is awarded annually, and is of the value of about £4.

More detailed information may be obtained from the University Calendar; from the Examination Statutes, latest edition; from the Regius Professor of Medicine; from the Professors in the departments of medical science; and from the Dean of the Medical School, Department of Medicine, University Museum, Oxford.

Radcliffe Infirmary and County Hospital

There are 385 beds. Courses of instruction are given in connexion with the Oxford University Medical School. These include (1) a course in Practical Medicine by the Regius Professor of Medicine; (2) clinical lectures by the Litchfield Lecturers in Medicine and Surgery; (3) tutorial instruction and demonstrations in special Regional Anatomy (medical and surgical), methods of Medical and Surgical Diagnosis, and Surgical Manipulation; and (4) pathological demonstrations and instruction in post-mortem work are given by the Pathologist. Opportunities are offered to students who wish to act as surgical dressers and clerks. A post-graduate [illegible] is held in the hospital in the autumn of each year.

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* For special diplomas see p. 454.

UNIVERSITY OF CAMBRIDGE

There are two degrees in Medicine, *M.B.* and *M.D.*, two in Surgery, *B.Chir.* and *M.Chir.*, and a Diploma in *Medical Radiology and Electrology*. Students of Girton or Newnham College are admitted to the examinations for these degrees and the diploma.

The student must enter a College, or become a Non-Collegiate student, and keep nine terms (three years) by residence. He must pass the Previous Examination of the University before he comes into residence or therefrom obtain exemption, particulars of which may be obtained from the Registrary. He may then devote himself to medical study in the University. Or he may, as nearly all students now do, proceed to take a degree in Arts by passing the Examinations for the Ordinary B.A. degree, or an Honours degree by passing one or more Tripos Examinations. The Natural Sciences Tripos is taken most frequently by medical students, as some of the subjects are practically the same as those for the M.B. course.

For the degree of Bachelor of Medicine (M.B.) five calendar years of medical study are required either in Cambridge or at one of the recognised Schools of Medicine. The first three years are spent in Cambridge till the student has passed the examination for Part I. of the Natural Sciences Tripos and the *First Examination* and other preliminaries to the *Final Examination*. Hospital practice may be attended at Addenbrooke's Hospital, Cambridge. The laboratories for Botany, Chemistry, Physics, Biology, Zoology, Human Anatomy, Physiology, Biochemistry, Pathology, Bacteriology, Pharmacology, and Psychology are well equipped. Addenbrooke's Hospital, the Infectious Diseases Hospital, the Cambridge Research Hospital, and the Field Laboratories are utilised for study and research.

The *First M.B. Examination* includes (1) General and Inorganic Chemistry, (2) Physics, (3) Elementary Biology, and (4) Inorganic Chemistry. These parts may be taken together or separately. After the First Examination, and tests in Pharmacology, Physiology, and Anatomy, comes the *Final Examination*, divided into two parts: (1) Principles and Practice of Surgery (including Special Pathology and Midwifery and Diseases Peculiar to Women); and (2) Principles and Practice of Physic (including Diseases of Children, Mental Diseases, Medical Jurisprudence), Pathology (including Hygiene and Preventive Medicine), and Pharmacology (including Therapeutics and Toxicology). The examinations are partly in writing, partly oral, and partly practical, in the hospital, in the dissecting room, and in the laboratories. An Act has then to be kept by the candidate reading an original dissertation composed by himself, and being examined orally, on some subject approved by the Regius Professor of Physic. Candidates who have passed both parts of the Final M.B. Examination are admitted to the registrable degree of Bachelor of Surgery (B.Chir.) without separate examination and without keeping an Act.

The degree of Doctor of Medicine (M.D.) may be taken by a graduate of the University of eight years' standing who has passed the Final M.B. Examination. An Act has to be kept, consisting of an original Thesis with viva-voce examination; and an examination, oral or written or both, on the field of Medicine within which the Thesis falls may be allowed or required.

Candidates for the Degree of Master of Surgery (M.Chir.) who are M.A.'s may be admitted to the examination after they have become legally qualified under the *Medical Acts* to practise surgery. Others may be admitted to the examination when two years at least have elapsed after they have completed all that is required of candidates for the Degree of B.Chir. Candidates are required to pass an examination in Principles and Practice of Surgery, Surgical Anatomy and Surgical Operations, and Pathology, and to write an extempore essay on a Surgical Subject. (The examination is held in February.)

A Diploma in Medical Radiology and Electrology is granted. Candidates must hold a recognised medical qualification.

Scholarships and Prizes.—Medical studies are endowed by the numerous Natural Science scholarships at the various colleges, information about which can be obtained from the respective Tutors. There are Natural Science scholarships at most of the Colleges and prizes in the ancillary medical subjects. Some of these are entrance scholarships; some may be gained by students already in residence, and where suitable candidates are not forthcoming among such students the emoluments may be allotted to members of other Colleges. Valuable scholarships instituted on behalf of Medicine are the Tancred Studentships in Physic, tenable at Gonville and Caius College. The successful candidates must enter at the college within a month or remove there if they are members of any other college. Students are required to take the degree of M.B. as soon as they are of sufficient standing but may hold a Studentship for a further three years. Thus a student elected previous to admission to college can draw the emolument, the annual value of which is about £100, for eight years. Full particulars can be obtained from Mr. E. T. Gurdon, 28, Lincoln's Inn-fields, London. Among other scholarships and prizes may be mentioned the Balfour Studentship, for research in Biology, of the value of £300 a year for three years, not restricted to members of the University; the Frank Smart Studentship and Prizes for Botany and Zoology; the Shuttleworth Studentship for Zoology or Physiology tenable at Gonville and Caius College; and the Marmaduke Shield Scholarship in Human Anatomy. The one University prize in Medicine, the Raymond Horton Smith Prize, is awarded to that candidate for the degree of M.D. who presents the best thesis for the degree during the academical year, provided that he has taken honours in a Tripos Examination. The E. G. Faernsides Research Scholarship and several very valuable studentships are also awarded.

An abstract of the Regulations and Schedules of the range of the examinations in Chemistry, Physics, Biology, Pharmacology, and General Pathology may be obtained upon application to the Registrary, The Registry, Cambridge.

Addenbrooke's Hospital

267 beds. Clinical lectures in medicine and surgery, in connexion with Cambridge University medical school, are given at this hospital during the academical year; and practical instruction in medicine and surgery is given in the wards and out-patients' rooms by the physicians and surgeons daily during the term time and vacations.

UNIVERSITY OF LONDON

The University of London was constituted in 1836, reconstituted under the Act of Parliament, 1898, as a teaching as well as an examining body, and again reconstituted under Act of Parliament, 1926. All the metropolitan medical schools are constituent colleges, while Clinical Units have been established at St. Bartholomew's, the London, St. Mary's, St. Thomas's, University College Hospital, and the Royal Free.

A revision of the medical curriculum is in prospect. The Senate of the University has invited representatives of the Universities of Oxford and Cambridge and of the English Royal Colleges to meet in conference representatives of the Medical Faculty of the University with a view to devise constructive measures in remedy of difficulties which have been widely known to exist in London or elsewhere.

Internal and External Students.—All the examinations of this University are open to men and women alike. Matriculated students of the University may be either internal or external. Internal students of the University are students who are registered as pursuing a prescribed course of study, or an approved course of research, in a school of the University, or under teachers of the University. Centres for eliminary and intermediate medical studies have een established by the University at University and ing's Colleges. External students in addition to atriculating must register as preparing for an amination leading to a Degree or Diploma within e purview of the Council for external students.

UNIVERSITY COLLEGE

University College is a University centre for the aching of medical sciences. The College Faculty Medical Sciences comprises the departments of hysics, chemistry, botany, and zoology (the Pre-minary Medical Sciences);. also the departments anatomy and embryology, and physiology, bio-hemistry, and pharmacology (the Intermediate edical Sciences). Post-graduate and research work undertaken in all departments. The completion of he building scheme by the erection of the section for natomy, histology, and embryology, together with rther extensions to the department of physiology, iochemistry and biophysics, and also pharmacology ew accommodation for the department of zoology hich the generosity of the Rockefeller Foundation nade possible, provides exceptional facilities for esearch and post-graduate study. The opportunities or investigation in human and comparative embryo-ogy and neurology, in histology, radiology, anthro-ology, biochemistry, and experimental physiology nd embryology may be mentioned. In the depart-nent of zoology and comparative anatomy, the study of genetics accompanies that of comparative physio-ogy and animal behaviour. Arrangements exist for the close correlation of the work of the Faculty with University College Hospital and Medical School. Women students are admitted.

Scholarships and Prizes.—The first four items on the present list provide a complete intermediate course at University College, and, in the case of (*a*), the later clinical stages at University College Hospital. The money value and subjects at examinations are as follows: (*a*) Bucknill Scholarship, 160 guineas; (*b*) and (*c*) two Entrance Exhibitions, 55 guineas each, Chemistry, Physics, Botany, Zoology, and an English essay; (*d*) Entrance Scholarship, £30 a year for three years; (*e*) Ferriere Scholarship, £25 for three years, tenable at University College Hospital Medical School, awarded to a student who has done his Anatomy and Physiology at University College and has completed the 2nd Medical Examination; (*f*) Cluff Memorial Prize, £15 biennially, Anatomy, Physiology, Pharmacology, and Chemistry; (*g*) Schafer Prize in Physiology, £18 triennially; (*h*) Sharpey Physiological Scholarship, £115, Biological Sciences; (*i*) Bayliss-Starling Scholarship, £120 a year, Physiology, Biochemistry; (*j*) Percy F. Macgregor Research Scholarship in Embryology, £50; (*k*) Morris Bursary for sons of deceased professional men, by nomination, tenable for two years, £20 a year; and (*l*) two Gold Medals awarded annually in Anatomy and Physiology. For information apply to the Secretary, University College, Gower-street, London, W.C.1.

KING'S COLLEGE

The Medical Faculty at this College of the University gives instruction in the subjects of Medical Science for all the usual Preliminary and Intermediate Examinations in Medicine and Surgery. Through the four associated hospitals, students of the College have clinical facility of over 1000 beds, but they may also proceed to any other teaching hospital in London for final studies for the degrees of the University.

The Medical Faculty of the College provides a general University education in touch with other faculties, classes of which medical students are permitted to attend. There are many College ocieties, clubs, and functions, in which students of all faculties have opportunity of meeting each other. The College has a large athletic ground at Mitcham, upon which is a new pavilion.

The First Year subjects are taught in the large Departments of the Faculty of Science and those for the Second and Third Years in the new Medical Department which was opened recently, consisting of the Hambleden Department of Anatomy and an extension to the department of physiology, at a cost of £70,000. These new buildings and others of recent years, provide the College with a completely new and modern Medical Department which embodies the newest ideas in laboratory construction and equipment.

Scholarships and Prizes.—Two Warneford Entrance Scholarships of £30 each for four years. Examination in April, subjects selected from Divinity, Classics, Science. One Sambrooke Scholarship of £30 for three years. Examination in April, subjects selected from Classics, Science. Worsley Scholarships: £100 in five annual instalments of £20. *At the end of the First Year* of study, one Warneford Scholarship of £30 for four years, subjects as for First M.B., the Rabbeth Scholarships (£30 and £15), the Carter Gold Medal and Prize in Botany, and the Hare Prize in Zoology are open for competition. *At the end of the Third Year*, the Hughes Prize in Anatomy, the Huxley Prize in Physiology, the Inchley Prize in Pharmacology, and the Jelf Medal are open for competition. The Layton and the Berridge Research Studentships (£150 and £100 per annum respectively), the Daniell Scholarship in Chemistry (£40), Warneford Prizes (£25 and £15), Leathes Prize, Barry Prize, &c., are also open to Students of this Faculty. The majority of the Scholarships and Prizes are open to Regular Students only. For information apply to the Dean of the Medical Faculty.

The Medical Faculty of the University

Medical students of the University of London who are pursuing their medical curriculum in the metropolis will proceed to one of the recognised medical schools connected with the University. The schools are described in detail in the next section. These hospitals are St. Bartholomew's Hospital, Charing Cross Hospital, St. George's Hospital, Guy's Hospital, King's College Hospital, the London Hospital, St. Mary's Hospital, the Middlesex Hospital, St. Thomas's Hospital, University College Hospital, Westminster Hospital, and the London (Royal Free Hospital) School of Medicine for Women. Students of St. George's, Charing Cross, and Westminster Hospitals take their preliminary medical studies at King's College. Students of the London Hospital usually attend East London College for the subjects of their first medical examination. Various schools and hospitals are also recognised as schools of the University in special departments, and students may pursue their studies at other approved universities and medical schools.

The Faculty of Medicine of the University grants the joint degrees of M.B., B.S. (*Bachelor of Medicine and Surgery*), the higher separate degrees of M.D. (*Doctor of Medicine*) and M.S. (*Master of Surgery*), and the degree of B.D.S. (*Bachelor of Dental Surgery*) and the degree of B.Pharm. (*Bachelor of Pharmacy*); the two higher degrees being open only to candidates holding the M.B., B.S. degrees of the University. The curriculum for the M.B., B.S. degrees is five and a half years from the time of matriculation, with certain exceptions which must be looked for in the official regulations of the University.

A. *Internal Students.*—For the Bachelor's degrees in Medicine and Surgery a student must normally, after registration as an internal student, have: (1) Attended prescribed courses of study for five and a half years in one or more schools of the University. (2) Passed the following examinations, under the conditions mentioned below: (*a*) the First Examination for Medical Degrees in Inorganic Chemistry, Physics, including Mechanics, and General Biology; (*b*) the Second Examination for Medical Degrees: Part I., Organic Chemistry; Part II., Anatomy, Physiology, and Pharmacology; (*c*) the Third Examination for Medical Degrees, or M.B., B.S. Examination in Medicine, Surgery, Obstetrics and Gynæcology, Pathology, Forensic Medicine, and Hygiene.

B. *External Students.*—For the Bachelor's degrees in Medicine and Surgery an external student must (1) have passed the Matriculation examination or have been exempted therefrom not less than five and a half years previously; (2) have passed subsequent examinations similar to those required of an internal student; and (3) have been engaged in professional studies during the five and a half years subsequently to Matriculation and four and a half years subsequently to passing the First Examination for Medical Degrees at one or more of the medical institutions or schools recognised by this University for the purpose, one year at least of the four and a half years to have been spent in one or more recognised institutions or schools in the United Kingdom.

The First Examination for Medical Degrees (Inorganic Chemistry, Physics, including Mechanics, and General Biology) will take place twice in each year commencing on the Monday following Dec. 5th and on the first Monday in July. It must be passed not less than nine months after matriculation.

The Second Examination for Medical Degrees (Part I.): Organic Chemistry.—This examination will take place twice in each year, commencing on the Thursday following the second Monday in March and on the Thursday following the first Monday in July. No candidate will be admitted to this examination until he has completed the First Examination.

The Second Examination for Medical Degrees (Part II.) takes place twice in every year, commencing on the Tuesday following the third Monday in March and on the Tuesday following the first Monday in July. No candidate will be admitted to the examination unless he has passed the First Examination for Medical Degrees at least 18 months previously, and has passed Part I. of the Second Examination for Medical Degrees

The Third or M.B., B.S. Examination.—The M.B., B.S. examination takes place twice in each year, commencing on the second Monday in November and on the first Monday in May. No candidate will be admitted to this examination unless he has completed the Second Examination for Medical Degrees, together with a course of study summarised below, nor within three years from the date of passing the Second Examination, Part II., in Anatomy and Physiology. The course of study comprises introductory courses in (1) Clinical Medicine; (2) Clinical Surgery; (3) Clinical Pathology; and the following: Experience as Clinical Clerk; course in Clinical Medicine; (*a*) Fevers, (*b*) Children's Diseases, (*c*) Venereal Diseases, (*d*) Mental Diseases (at a recognised Asylum), (*e*) Dermatology, (*f*) Vaccination, (*g*) Materia Medica and Pharmacy; Experience as a Surgical Dresser; course in Clinical Surgery; Ophthalmology; Oto-Rhino-Laryngology; (*a*) Operative Surgery, (*b*) Applied Anatomy, (*c*) Administration of Anæsthetics, (*d*) Dental Surgery, (*e*) Orthopædic Surgery, (*f*) Mechano-therapeutics; Obstetrics and Gynæcology; Lying-in Hospital; the conduct of at least 20 Labours; Ante-natal Clinic; Experience as a Clinical Clerk in Gynæcological Work; General Pathology, Morbid Anatomy, Bacteriology, and Chemical Pathology; Work in the Post-mortem Room; Clinical Laboratory; Forensic Medicine; Hygiene. He must have attended the Medical and Surgical Practice of a recognised hospital for two years, and have held the posts of clinical clerk and surgical dresser for periods of six months each. Candidates will be examined in Medicine, Pathology, Forensic Medicine and Hygiene, Surgery, Obstetrics, and Gynæcology. The subjects may be divided into two groups—namely: (1) Medicine, Pathology, Forensic Medicine, and Hygiene; and (2) Surgery, Obstetrics, and Gynæcology, and may be taken either separately or together.

Doctor of Medicine.—The examination for this degree takes place twice in each year, commencing on the second Monday in December and on the first Monday in July. Candidates may present themselves for examination in one of the following branches—namely: (1) Medicine; (2) Pathology; (3) Psychological Medicine; (4) Midwifery and Diseases of Women; (5) Hygiene; and (6) Tropical Medicine. Any candidate may transmit to the Registrar a thesis for approval and may be exempted from a part or from the whole of the written examination.

Master of Surgery.—The examination for the degree of Mastery of Surgery takes place twice in each year: (1) Surgery; (2) Dental Surgery; (3) Ophthalmology; (4) Laryngology, Otology, and Rhinology. A thesis may be submitted as for M.D.

Doctor of Philosophy.—A Degree of Ph.D. has been instituted in non-clinical subjects for Internal and External Students in the Faculty of Medicine. Candidates for this degree must hold, in a branch of study akin to that in which they propose to proceed to the Ph.D. Degree, the Degree of M.B., B.S., or B.D.S., or B. Pharm., or B.Sc.

Bachelor of Pharmacy.—This is a three years' course.

Full details of the prescribed curricula can be obtained free on application to the Academic Registrar, or for External Degrees from the External Registrar, University of London, South Kensington, S.W. 7.

MEDICAL SCHOOLS OF THE UNIVERSITY OF LONDON [1]

St. Bartholomew's Hospital and College

The hospital contains 762 beds, of which 692 are for patients in the hospital at Smithfield and 70 at the Alexandra Hospital, Swanley. Special departments have been organised for diseases of women and children, the eye, ear, larynx, and skin, as well as for orthopædic and dental surgery, and for electro-therapeutics and X ray work. Whole-time Clinical Units under professors of medicine and surgery have been established. A new surgical block of ten wards, with accommodation for 250 patients, and connected with a block of five new operation theatres is now in use. Clinical Units in medicine (*and surgery*) have been established under whole-time directors.

Ten house physicians and ten house surgeons are appointed annually, are provided with rooms and board, and receive £80 a year as salary. A resident midwifery assistant, an ophthalmic house surgeon, and a house surgeon for diseases of the throat, nose, and ear, and a house surgeon for orthopædic surgery are appointed every six months, and are provided with rooms and board and receive a salary of £80 a year. Three resident administrators of anæsthetics are appointed, the senior for one year at a salary of £150, and two juniors for six months with a salary at the rate of £80 per annum, with board and rooms. An extern midwifery assistant is appointed every three months, and receives a salary of £80 a year. The clinical clerks, the obstetric clerks, the clerks to the medical out-patients, the dressers to the surgical in-patients and to the out-patients, and the dressers in the special departments are chosen from the students.

There are quarters for the resident staff, casualty, medical, surgical, and special out-patient departments, casualty wards, dispensary, and clinical lecture theatre. There is a chemical laboratory attached to the College as well as a laboratory devoted to instruction in public health. A block is devoted to pathology, and contains the post-mortem room as well as extensive laboratories for bacteriology, clinical pathology, and pathological chemistry. *The Medical College Buildings* include three large lecture theatres, a large dissecting-room, laboratories for chemistry, biology, morbid anatomy and histology, and public health, as well as a spacious library (containing 14,500 volumes), a well-appointed museum of anatomy-physiology, comparative anatomy, materia medica botany, and pathological anatomy. The pathological museum is complete. A new block in Giltspur-street has recently been acquired and has been fitted up as lecture theatres and laboratories for physics, chemical physiology, experimental physiology, histology, and pharmacology.

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[1] Of these schools that of the Royal Free Hospital is reserved for women; University College and King's College admit men and women, both of them limiting the number of women when clinical work is reached; the remainder admit men only. Further information from respective Deans of schools. Plans are being considered for starting a medical school for women at the West London Hospital. These are not yet ripe for publication.

The College has recently bought the site and buildings in Charterhouse-square (five minutes' walk from the Hospital), formerly occupied by The Merchant Taylor's School, and the whole of the preclinical departments will shortly be transferred there.

Special Classes for the Primary and Final F.R.C.S. Examinations are held twice yearly. *Instruction in Preliminary Science* is given to University of London students in chemistry, biology, and physics throughout the year. Facilities for research work are afforded in the Clinical Units and laboratories of pathological and other departments. *Vacation Anatomy Courses* are given in spring and summer.

Scholarships given in aid of Medical Study.—Six Entrance Scholarships and Exhibitions are awarded annually—viz.: (1) and (2) a Scholarship entitling the holder to free undergraduate medical education for a period of three years; and an Exhibition of £60 in any two of the following subjects: Human Anatomy and Embryology, Physiology, Pathology (including Bacteriology), Biochemistry; (3) a Scholarship of £100 in Chemistry, Physics, and Biology; (4) and (5) a Scholarship of £100 and the Jeaffreson Exhibition of £50 in Mathematics, Latin or Greek or French or German, a second language or Chemistry or Physics; (6) Helen Cave Memorial Scholarship, awarded after open competition to sons of Registered Medical Practitioners, value about £200, conditions obtainable from the Dean; (7) Shuter Scholarship of £50 in Anatomy and Physiology, which is awarded after competitive examination among Cambridge Graduates. The more important of the other Scholarships and prizes are as follows: Four Junior Scholarships—(8) No. 1, £30, Anatomy and Physiology; (9) No. 2, £20, Anatomy and Physiology; (10) No. 3, £25, Chemistry, Physics, and Biology; (11) No. 4, £15, Chemistry, Physics, and Biology; (12) Senior Scholarship, £50, Anatomy, Physiology, and Chemistry; (13) Kirkes Scholarship, £30 and medal, Clinical Medicine; (14) and (15) two Brackenbury Scholarships, £39 each, one in Medicine and one in Surgery; (16) Sir G. Burrows Prize, 10 guineas, Pathology; (17) Skynner Prize, 13 guineas, Regional and Morbid Anatomy; (18) Matthews Duncan Medal and Prize, £20, Midwifery and Gynæcology; (19) Luther Holden Research Scholarship in Surgery, awarded by election, £105; (20) Lawrence Research Scholarship and Gold Medal in Pathology, awarded by election, £115; and (21) Baly Scholarship in Clinical Medicine, £75, awarded by examination.

The recreation ground of 10 acres, for the use of the members of the Students' Union, is at Winchmore Hill. The Union's premises at the Hospital contain a large reading and smoking room, a committee and writing room, luncheon and dining hall, and a miniature rifle range. Athletic amenities are also available on the new site in Charterhouse-square.

Charing Cross Hospital

The Hospital, to which the School is attached, contains 300 beds. The School has just celebrated its centenary, accompanied by a public appeal for funds with the principal object of providing a students' hostel. There are special departments for mental diseases, midwifery, diseases of women, of children, of the skin, ear, throat, nose, and teeth, for orthopædic cases, X ray work, and for electrical treatment. In the medical school demonstratorships and assistant demonstratorships are open to students of the school. Eight house physicians, six house surgeons, two obstetric and gynæcological house surgeons, six house surgeons to the special departments, two resident anæsthetists, and four clinical pathologists are appointed annually. The following appointments are open to students after they have held resident appointments: resident medical officer, at a salary of £400 per annum; resident casualty officer, at £200 per annum; and five registrars to the medical, surgical, obstetrical, and ear, nose, and throat departments, at £150 per annum each.

Primary and Intermediate students receive their lectures and practical work at King's College, and final studies are taken in the school and hospital, where systematic lectures, demonstrations, and tutorial classes are arranged in general and special subjects.

In the Institute of Pathology, under a whole-time staff of scientific workers and in fully equipped laboratories, students receive their training in preventive medicine, pathology, and bacteriology. There are special facilities for research, and post-graduate teaching is available. The course in practical ophthalmology is given in the Royal Westminster Ophthalmic Hospital. Courses in general medicine, surgery, and pathology, with the requisite clinical work in the wards and out-patient departments, are provided for students reading for dental qualifications.

The pathological museum, containing over 4000 specimens and 3000 histological preparations, comprises (1) the section on general pathology, and (2) the Cuthbert Lockyer Collection of over 1150 gynæcological and obstetrical specimens. The library contains 3950 volumes including the latest editions of text-books.

Scholarships and Prizes are offered annually: (*a*) for students commencing medical studies—two scholarships, each of the value of £50; (*b*) for students commencing clinical studies—two "University" scholarships, each of the value of £120, in Pathology; one "University" scholarship value £120, and one "Open" scholarship, value £75, in Anatomy and Physiology. There are a number of Exhibitions, and the following prizes are offered: (1) "Llewellyn" Prize, £25, for highest distinction throughout the final course of studies; (2) "William Travers" Prize, £15; (3) "J. H. Morgan" Prize, £10; other prizes in money are the "Pereira," "T. H. Green," and "Stedman," while prizes in money are offered for proficiency in clinical medicine and surgery, and all the different subjects of the curriculum.

The Students' club, with smoking and luncheon rooms on the school premises, cloak room, telephone, &c., provides for the social comfort and convenience of the students. The club is controlled by a committee of students, and includes the Medical Society and the Dramatic Society. The *Gazette* is published quarterly. The sports ground, of 8 acres, at Colindale affords facilities for Rugby and Association football, cricket, hockey, and tennis (hard and lawn courts). In addition there are sections of the club devoted to athletics, boxing, swimming, golf, and badminton.

St. George's Hospital

This hospital has a service of 436 beds, of which 180 are allotted to surgical, 150 to medical cases, and 100 are at the Convalescent Hospital at Wimbledon. There are all the usual special clinical departments. One ward is set apart for diseases peculiar to women, and there is a maternity ward of 11 beds. One ward is set apart for the medical diseases of children. There are two ophthalmic wards.

Eight house physicians, eight house surgeons, and eight casualty officers are appointed annually. Special attention is directed to the following paid appointments, among others, which are open to students after they have held house office: resident assistant physician at £250 per annum; medical officer to the Atkinson-Morley Convalescent Hospital at £300 per annum; medical registrarship at £200 per annum; two surgical chief assistants at £225 per annum; assistant curatorship of the museum at £100; obstetric assistantship (resident) at £100; the post of resident anæsthetist at £100.

The teaching and laboratories are devoted to clinical subjects, and arrangements have been made with the authorities of King's College and University College for students who enter the first, second, or third year of the curriculum as students of St. George's to carry out the necessary courses of instruction at one of those Colleges. Students then complete their course, without payment of any entrance fee, in a school entirely devoted to clinical work.

Scholarships and Prizes.—At this school 11 entrance scholarships and exhibitions are given, the money value and the subjects of examination being as follows: (*a*) and (*b*) two William Brown Exhibitions, £120 and £80 respectively; (*c*) and (*d*) two Anne Selina Fernee Scholarships, £80 each; (*e*) Devitt-Pendlebury Scholarship, £40 (approx.); (*f*) and (*g*) two Anne Selina Fernee Exhibitions, £60 each, Anatomy and Physiology, except in the case of (c) and (*f*) subject of examination for which is General Pathology.

In addition to the above, Exhibitions each of the value of £40 and up to four in number may be awarded to candidates of approved merit in the Entrance Scholarships Examination. The others are as follows: (*h*) Allingham Scholarship in Surgery for Students qualified not more than two years, £87; (*i*) and (*j*) two Brackenbury Prizes, one in Medicine and one in Surgery, £33 each, open to students of not more than five years' standing; (*k*) H. C. Johnson Memorial Prize, £20, Practical Anatomy; (*l*) Pollock Prize, £24, Physiology, Physiological Chemistry, and Histology; (*m*) Clarke Prize, £5; (*n*) Thompson Medal, £9, Clinical Reports; (*o*) Brodie Prize, £8, Clinical Reports; (*p*) Webb Prize, open to perpetual pupils, £34, Bacteriology; (*q*) Sir Francis Laking Memorial Prize, £45, open to students having registrable qualifications.

The Library is fully stocked with the latest and best text-books. The Pathological Museum has recently undergone complete revision. In addition to its well-known specimens of great historical interest, it contains a complete range of pathological conditions, set out in such a way that the student can easily obtain the fullest information relating to any disease.

The St. George's Hospital Club, with smoking- and luncheon-rooms on the hospital premises and an athletic ground at Wimbledon, is an amalgamation of the Hunterian Society, the *Gazette*, and the Rugby football, cricket, lawn tennis, boxing, rifle, and golf clubs. Students have the advantage of a library of medical and scientific books which is kept up to date.

Guy's Hospital

The Medical School, which has been entirely rebuilt within recent years, provides ample accommodation with modern equipment for all the non-clinical subjects of the medical curriculum. The School is a constituent part of the University of London and offers a complete medical education of University standard throughout. The Hospital contains 646 beds. On commencing the clinical period, students are placed for three months under the charge of an experienced clinical tutor while they are given a preliminary course of instruction in methods of clinical examination. Thereafter they hold a series of appointments, each of three months' duration, in surgical, medical, and obstetrical and gynæcological wards.

The following special departments are attached to the hospital: Departments of ophthalmology, laryngology, gynæcology, diseases of children, diseases of the nervous system, psychological medicine, dermatology, otology, actino-therapeutics, anæsthetics, dentistry, orthopædics, vaccine, tuberculosis, genito-urinary, venereal diseases, and the Salomon's Welfare Centre (for maternity and children). There is a Venereal Clinic in accordance with the scheme of the Local Government Board and the London County Council.

House physicians, house surgeons, out-patient officers, assistant house surgeons, obstetric residents, house surgeons in the departments of ophthalmology, laryngology, and genito-urinary diseases, house physicians in the departments for neurology and dermatology and for diseases of children, and clinical assistants are appointed from among recently qualified students according to merit.

Scholarships.—Six Entrance Scholarships are awarded annually as follows: (*a*) one War Memorial Scholarship, of the value of £200, to be awarded alternately in Arts and Science (next award, April, 1936, in Arts); (*b*) one Open Arts Scholarship of £100 for students under 19 years of age, awarded annually in April; candidates are required to take English and any two of the following subjects: Latin, Greek, French, German, and Mathematics; (*c*) one Open Junior Science Scholarship for students under 20 years, £100; subjects any three of the following: Inorganic Chemistry, Physics, Biology, and Mathematics; (*d*) a confined Junior Science Scholarship of the value of £100 is offered for competition, annually April, to candidates who have attended the Preliminary Science Classes at this School; (*e*) University Entrance Scholarships. These are (1) a War Memorial Scholarship entitling the holder to free medical education for three years, awarded annually in June or July; (2) an open exhibition of the value of £60, awarded annually in June or July, for students who have completed their examinations in Anatomy and Physiology in a British School or University outside the London Metropolitan area; subjects, any two of the following: Human Anatomy and Embryology, Physiology, Pathology including Bacteriology, Biochemistry. The examination is held in common with the Medical School at St. Thomas's Hospital and the Medical College of St. Bartholomew's Hospital

The Wills Library contains 10,000 volumes of standard text-books and books of reference, the Museum contains upwards of 5000 specimens of pathological anatomy, supplemented by more than 2000 drawings.

Prizes.—The following prizes are awarded annually: (*a*) Treasurer's Medal and Prize for Clinical Medicine; (*b*) Treasurer's Medal and Prize for Clinical Surgery; (*c*) Golding-Bird Gold Medal and Scholarship (£20) for Obstetrics and Gynæcology; (*d*) Golding-Bird Gold Medal and Scholarship (£20) for Bacteriology; (*e*) Charles Oldham Prize in Ophthalmology (£30); (*f*) Beaney Prize for Pathology (£34); (*g*) Leonard Lubbock Prize for Clinical Pathology; (*h*) Wooldridge Memorial Prize for Physiology (£10); (*i*) Sands-Cox Scholarship in Physiology (£45)—awarded triennially; (*j*) Prizes in Anatomy and Physiology for General Proficiency of the value of £20, £15, and £10 respectively; (*k*) Michael Harris Prize for Dissections (£5).

Studentships.—The following Studentships are open to graduates from this School: (1) Gull Studentship in Pathology (approx. £250 per annum); (2) Arthur Durham Travelling Studentship (£100)—awarded triennially; (3) Beaney Studentship in Materia Medica (£60 per annum); (4) Anderson Demonstratorship in Clinical Chemistry (£175 per annum); (5) Griffiths Demonstratorship and Research Studentship in Pathology (£320 per annum); (6) Adrian Stokes Fellowship in Pathology and Bacteriology (£300)—awarded biennially.

Within the grounds of the hospital are situated the residential college, with accommodation for 35 students, the students' club, with reading, smoking, luncheon, and dining-rooms, a squash court, a fives court, and swimming bath. The athletic ground and club house is situated at Honor Oak Park, and can be reached in 15 minutes from the hospital.

King's College Hospital

The New Medical School at Denmark-hill, opened in July, 1933, contains the Museum, Research Laboratory, Research Rooms, Common Rooms, Lecture Rooms, Refectory, and two Squash Rackets Courts.

Provision is made for all the subjects of the medical curriculum. The Hospital was opened in 1913, and is one of the most modern and best equipped in England. In the education at the hospital a special feature has always been the individual attention given to each student. The studies are co-ordinated under the direction of senior members of the honorary staff, assisted by medical, surgical, obstetric, and pathological tutors. Ten women medical students are admitted annually.

The numerous appointments open to students are those of clinical assistant to the general and special departments; medical, surgical, obstetric, and pathological tutorships; resident casualty officers, house physicians, and house surgeons; resident anæsthetist; resident radiologist; bacteriologist; clinical pathologist; pathological, medical, surgical, obstetrical and other registrarships. Thirty-one resident medical and surgical officers are appointed each year.

Post-graduate Courses.—Two advanced medicine courses are held annually, and are suitable for preparation for M.D. and M.R.C.P. Examinations.

Scholarships.—Those in connexion with King's College have already been enumerated. Scholarships of the total value of £1530 are awarded annually. These include: (*a*) Medical Entrance Scholarships—Science, £75; Anatomy and Physiology, £75; Pathology, £75; (*b*) two Burney Yeo Entrance Scholarships, £105 each, open to students of Oxford and Cambridge on the recommendation of the Regius Professsors; (*c*) two Raymond Gooch Scholarships, £105 each, open to students of British Universities on certain conditions; (*d*) Epsom College Scholarship, value £100, offered annually to a student of Epsom College who has taken the first part of the courses for Medical Degrees at the Universities of Oxford, Cambridge, or London; (*e*) two Seaman Scholarships, each £50 a year for a period not exceeding five years, restricted to the sons of clergymen of the Church of England; (*f*) Senior Scholarship (Clinical Studies), £40. The holders of the Warneford and Sambrooke Scholarships take the subjects of the preliminary and intermediate examinations at King's College, and the final subjects at King's College Hospital.

Prizes.—Tanner Prize, £10, Obstetrics and Diseases of Women; Todd Prizes, first £8 and medal, second £4, for Clinical Medicine; Burridge Prize, £4 4*s.*, Forensic Medicine; Jocelyn Almond Prize, £5 5*s.*, Diseases of Children; Wallis Prize, £10, Dentistry; The Ferrier Prize in Neurology, Bronze Medal and £20; The Legg Prizes in Surgery and Surgical Pathology, Ware Prize for General Pathology, Cheyne Prize for Surgery. Special Prizes for Diseases of Children, Orthopædic and Urology. Thirteen Class Prizes of £3.

Clubs, Hostel, Athletic Ground.—The King's College Hospital Clubs and Societies Union consists of the Listerian and Musical Societies, the Students' Common Rooms, and the various athletic and sports clubs. The athletic ground, over six acres in extent, is on Dog Kennel Hill, about ten minutes' walk from the hospital. There are also tennis courts in the grounds of the hospital and of "The Platanes"—a hall of residence for students. The Library contains 7000 bound volumes in addition to the medical and scientific periodicals. There are good facilities for quiet reading and books are lent for use at home.

London Hospital

The hospital, with its Medical College and Dental School, contains 847 beds. Its neighbourhood to the extensive docks, factories, and workshops of the east of London is unrivalled, and presents an immense field for clinical instruction. There are special departments for the treatment of diseases of children, the eye, ear, nose and throat, skin and teeth. In addition there are departments devoted to gynæcology and obstetrics, orthopædics, cardiology, neuro-surgery, radiology, electro- and physico-therapeutic light therapy, radium, and vaccine therapy.

A Clinical Unit in medicine, under the charge of a whole-time director, provides for the more elaborate methods of diagnosis and treatment, and takes a leading part in the initiation and coördination of medical research. The director has an assistant director, two assistants, and two house physicians.

To each medical and surgical firm throughout the hospital there is attached a first assistant, who is responsible for instructing the clerks or dressers of the firm in elementary medicine and surgery, and who assists the honorary members of the firm in the preparation of their demonstrations. In the department of obstetrics and gynæcology there is a first assistant and two resident accoucheurs. In the department for children's diseases there is a first assistant, a house physician, and two clinical assistants. Special courses of lectures and demonstrations are arranged in medicine and surgery and their ancillary subjects. Opportunities for research are provided under the supervision of the staff.

Many appointments are open to students before and after qualification, and holders of resident appointments have free board. Special classes are held for the examinations of the University of London, for the Fellowship of the Royal College of Surgeons, for the Membership of the Royal College of Physicians, and for other higher examinations. Special entries for medical and surgical practice can be made.

The salaried appointments open to past students of the hospital are those of assistants to the medical unit; first assistants to the medical and surgical firms; assistants to the departments of obstetrics and gynæcology; clinical assistants in the medical, surgical, ophthalmic, aural, light and skin, orthopædic, and electrical departments, and in the institute of pathology and clinical laboratory. There are appointed annually 4 resident accoucheurs, 16 resident house physicians, and 19 resident house surgeons, 14 resident receiving-room officers, 8 resident emergency officers, 8 clinical assistants to the medical out-patient department, and 16 clinical assistants to the surgical out-patient department, also paid and unpaid clinical assistants in the various special departments.

Scholarships and Prizes.—Entrance Scholarships: Price Scholarship £100, and one Scholarship of £50, subjects of First Medical Examination at the University of London; Epsom College Scholarship, free education, subjects of First Medical Examination as above; Price Scholarship, open to students of Oxford and Cambridge Universities, £100, Human Anatomy and Physiology; two Open Scholarships, each of the value of £100, subjects, Human Morphology and Embryology, Physiology and Pharmacology, Biochemistry, Pathology, Bacteriology, and Morbid Anatomy. Prizes: Buxton Prize, £40, subject of Anatomy and Physiology; Prize in Clinical Obstetrics and Gynæcology, £20; Sutton Prize, £20, Pathology; Duckworth Nelson Prize, biennial, £10, Practical Medicine and Surgery; Letheby Prizes (2), £25, Chemistry and Chemical Pathology; four Dressers' Prizes, amounting to £20, zeal, efficiency, and knowledge of Elementary Clinical Surgery; Hutchinson Prize, triennial, £60. Clinical Surgery; Treves Prize, £20, Clinical Surgery; two Practical Anatomy Prizes, £6 and £4 respectively; Andrew Clark Prize, £14, Clinical Medicine and Pathology; T. A. M. Ross (Prox. Acc.) Prize, £10 10*s.*, Clinical Medicine and Pathology; James Anderson Prizes (4), £20, Elementary Clinical Medicine; Arnold Thompson Prize, £15, Diseases of Children; and Liddle Prize, triennial, £120.

Medical Research Funds.—Funds to the value of over £113,000 permit of financial assistance being given to students and graduates engaged in Medical Research.

A laboratory for the manufacture of certain preparations of Radium has recently been endowed.

A new Residential Hostel has been opened and provides accommodation for 50 students. The hostel includes a library, writing, common and dining room, and 2 squash racket courts. There is also a hostel for resident medical officers. The Union Athletic Ground, 13 acres, is within easy reach of the hospital.

St. Mary's Hospital

The Hospital and Medical School have on one side a poor district of 500,000 persons, one-tenth of whom, on an average, pass through the hospital annually. On the other side are the residential districts of Kensington and Bayswater, making it possible for the student to live in touch with his work.

The hospital contains 370 beds, and recent structural additions have added two new operating theatres. By a scheme of affiliation, for teaching purposes, of certain neighbouring hospitals the teaching facilities extend over 1000 beds. The medical school provides complete courses of instruction, and students can join at once on passing a preliminary examination in arts. Terms begin in October, January, and April.

Clinical Units in medicine and surgery were established in 1920. Under this system professors of medicine and surgery, with competent assistants, give their whole time to teaching and research. The system also provides additional salaried posts which are open to students after qualification.

The Hospital has lying-in beds to which considerable additions have been made during 1933, and in addition to the instruction thus obtained each student attends a short course at Queen Charlotte's Hospital, as part of his training in Midwifery, without additional fee.

Students specially interested in Pathology and Bacteriology have singular advantages at St. Mary's. The institute comprises seven special departments, the whole being under the personal direction of Sir Almroth Wright. Research Scholarships of £200 each are awarded annually to students working in the departments, and research beds have been instituted. Clerkships in pathology, bacteriology, and chemical pathology, lasting for a period of three months, are open to students of the fifth year and enable them to carry out the pathological and bacteriological investigations of the wards, and learn the necessary technique under supervision. Seventy-two of these posts are available annually. Numerous appointments are open to newly qualified members of the medical school, including seventeen salaried posts with salaries varying up to £750 per annum. A special post-graduate course is held during the first week-end in October, and is open to all general practitioners and other qualified men without fee.

Entrance Scholarships.—From three to five Entrance Scholarships, each representing free tuition, are awarded annually by nomination.

The medical school and Institute of Pathology have been rebuilt on a site adjoining the Hospital, and the buildings are now in use. The new school provides for the teaching of the entire curriculum. A library and speech hall occupies a prominent position upon the ground floor, and a students' restaurant opens on to a courtyard, where are a garage for 50 cars and a swimming bath. A squash rackets court and gymnasium with a boxing-ring open out of the students' common room.

The athletic ground (10 acres) is situated at Wembley and can be reached in 20 minutes by a constant service of trains.

Middlesex Hospital

The hospital and cancer wing contain over 534 beds, with special wards for cancer, maternity, gynæcological, otological, neurological, dermatological, and ophthalmological cases, and for diseases of children. Other special departments include those for diseases of the eye, ear, nose and throat, and skin; nervous diseases, orthopædic cases, diseases of the rectum, and venereal diseases. There is also an electrotherapeutic department and a department of radium therapy and research. The cancer wing, containing 90 beds and special investigation laboratories, offers unrivalled opportunities for the study of cancer, both in its clinical and pathological aspects. In the electrotherapeutic department, students obtain instruction in the treatment of lupus and cancer by the X ray method of treatment.

The following appointments are made at intervals annually: eight house physicians, eight house surgeons, two obstetric and gynæcological house surgeons, two casualty medical officers, two casualty surgical officers, one senior resident anæsthetist, two junior resident anæsthetists, four resident officers to the special departments, and two dental house surgeons. Nine registrars are appointed annually. Non-resident qualified clinical assistants are appointed to assist in the various out-patient departments. Clinical clerks and surgical dressers are also appointed in every department.

The medical school, which includes the Bland-Sutton Institute of Pathology, the Courtauld Institute of Biochemistry, the Barnato-Joel Laboratories, and the Ferens Institute of Otology, is fully equipped for the theoretical and practical teaching of all the subjects of the medical curriculum, and the University diplomas in radiology. Ample laboratory and classroom accommodation is provided. The teaching staff includes 6 professors, 2 university readers, 31 recognised teachers, 10 demonstrators, 4 tutors. The Bland-Sutton Institute of Pathology and the Courtauld Institute of Biochemistry are completely equipped for routine hospital investigations, teaching, and research work, and contain large pathological, bacteriological, and clinical laboratories, also smaller laboratories for individual research work. A well-equipped anatomical and pathological museum and reference library offer every facility.

Other features of interest are: the course in medical radiology and electrology, under the direction of the "Joel" Professor of Physics and Dr. J. H. Douglas Webster. Primary F.R.C.S. courses are held twice yearly.

Scholarships and Prizes.—Two Entrance Scholarships, value £100 each, and two University Scholarships, value £90 and £60, are awarded annually in September. The successful candidates are required to become general students of the school. A Freer Lucas Scholarship is awarded annually on the nomination of the Headmaster of Epsom College. There are also two Broderip Scholarships, value £60 and £40 respectively; the Lyell Gold Medal and Scholarship, value £55 5s.; the John Murray Medal and Scholarship, value £25 (awarded every third year); the Freeman Scholarship, value £30; the Hetley Clinical Prize, value £25; the Leopold Hudson Prize, value 11 guineas; and the Second Year's Exhibition, value 10 guineas. There are numerous class prizes.

The Students' Amalgamated Clubs include the following: Medical Society, Common Room Society, Musical Society, cricket, football, rowing, chess, lawn tennis, hockey, sailing, golf, and fencing. There are a restaurant and a gymnasium in the school buildings, and athletic grounds at N. Wembley. Squash rackets are also available.

St. Thomas's Hospital

This hospital consists of eight linked-up pavilions, the medical school building being separated from the hospital by a quadrangle; the school buildings comprise the department of anatomy with its lecture theatre, museums, and research laboratory, the Sherrington School of Physiology, and a newly rebuilt department of chemistry with physical and biological laboratories. The hospital contains 644 beds and, in addition, has 30 beds at the Pyrford Orthopædic Hospital and 22 beds at the St. Thomas's Babies Hostel; there are teaching facilities for a further 150 beds, while students profit by liaison with Lambeth Hospital, where demonstrations are arranged at regular intervals. There is a Clinical Unit in medicine under a whole-time director, with laboratories and reading-room in connexion.

A complete curriculum is provided for students, the hospital having departments for the treatment of all the specialties. Particular attention is given to antenatal instruction and the teaching of diseases of children. A tuberculosis department in the hospital forms part of the Lambeth anti-tuberculosis scheme. The V.D. department is part of the L.C.C. scheme. In each department much clinical material is available. Instruction in anæsthetics takes place during appointment as dresser. Private coaching facilities are available and classes for the Primary F.R.C.S. Eng. are held. Revision classes have also been instituted in anatomy and physiology in accordance with the medical curriculums of Oxford and Cambridge. The obstetric training of students is now supplemented by an arrangement with St. James Hospital, Balham, whereby throughout the year two students at a time are in residence and take part in the maternity work. A special maternity ward of the hospital gives the student scope for elementary training before he undertakes cases in the district. In addition to the usual routine as clerk and dresser, every student works for a period of three months at the Medical Unit of the hospital. The post-mortem room, rebuilt in 1932, has a large amphitheatre adapted for teaching purposes and for the intimate study of morbid pathology.

The following appointments are open to students: 25 clinical assistantships to the various special departments are appointed every three months. Eight resident casualty officers and anæsthetists, seven house physicians, and nine house surgeons are appointed every six months. Nine chief assistants unpaid are appointed to the special departments, while there are nine non-resident registrars, medical, surgical, obstetric, and ophthalmic. A resident anæsthetist, a resident assistant physician, and a resident assistant surgeon, appointed annually, receive a salary. The assistants in the medical and surgical units hold appointments with a minimum tenure of four years, and there are three assistants in the department of pathology holding annual appointments. These officers are salaried.

A resident assistant physician and a resident assistant surgeon, salary £225 each per annum, and a resident anæsthetist, salary £200 per annum, are appointed annually. Three medical and four surgical registrars at a salary of £250 rising to £300 hold their appointments on a tenure renewable to a maximum of four years. A pathological registrar to the department of obstetrics and gynæcology (at an annual salary of £250), an ophthalmic registrar (at an annual salary of £200), and an orthopædic registrar (unpaid) are appointed yearly. Eight resident casualty officers and anæsthetists are appointed every six months. Seven house physicians (including two obstetric house physicians and one house physician to the department of diseases of children), nine house surgeons (including two ophthalmic house surgeons, one orthopædic house surgeon, and two house surgeons to the ear, nose, and throat department) are appointed every six months. Clinical assistants in the special departments are appointed every three months, and hold office for six months if recommended for re-election. There are three assistants in the department of pathology; the senior receives £600 a year, and the two juniors £450 each.

Scholarships and Prizes.—At this school there are the following Entrance Scholarships—namely, one in Arts, equivalent to the tuition fees for the first two years of study; three in Natural Science, of the value of £150, £100, and £60 respectively; and the University Scholarship of £100 in any two of the following—Anatomy, Physiology, Pathology, Chemistry; also the "Hector Mackenzie" University Exhibition of the value of £60. The value of all entrance scholarships must be taken out in tuition fees. The money value and subjects of examination of the remainder are as follows: (*a*) William Tite Scholarship for second-year students, £25; (*b*) and (*c*) Musgrove Scholarship or (alternately) Peacock Scholarship each for third-year students and tenable for two years, £35 each; (*d*) Mead Medal, Medicine, Pathology, and Hygiene; (*e*) Wainwright Prize, Medicine; (*f*) Toller Prize, Medicine; (*g*) Cheselden Medal, Surgery and Anatomy; (*h*) Clutton Memorial Medal in Clinical Surgery, biennial; (*i*) Beaney Scholarship, £50, biennially, Surgery and Surgical Pathology; (*j*) Solly Medal and Prize, biennial, Reports of Cases; (*k*) Sutton Sams Prize, biennial, Report of Cases; (*l*) Bristowe Medal, Pathology and Morbid Anatomy; (*m*) Hadden Prize, Pathology and Morbid Anatomy; (*n*) Grainger Testimonial Prize, £31 10*s*., Anatomy and Physiology; (*o*) Louis Jenner Research Scholarship, tenable for two years, £60 annually, Pathology; Perkins Research Fellowship, £40–£100; Myers Prize in Psychological Medicine, £10 10*s*.

In the school buildings are a reading room and library, containing approximately 8000 volumes. There is here a selection of new editions of current text-books, and periodical literature suitable to the needs alike of students and research workers. The Shattock museum, which forms part of the buildings, contains 5000 preparations, illustrating all morbid lesions of importance, an illustrative type series, and many specimens of historical interest. In the west wing of the school are the pathological institute and photographic department.

Opposite the hospital is St. Thomas's House, the premises of the amalgamated clubs, providing all the usual amenities and having squash courts, a miniature rifle range, and ample garage accommodation. There is a hard tennis court in the quadrangle. A hostel in the same buildings will receive 50 resident students. Field games are provided for and there is a sports ground at Chiswick.

University College Hospital

The final subjects in the curriculum are taught at the medical school of the hospital, which has 540 beds, including 85 in the new obstetric hospital. Clinical Units in medicine, surgery, and obstetrics and gynæcology are now in operation. The whole-time directors of the Units are concerned with the organisation of the teaching generally, but the honorary staff are responsible for the largest share of the teaching in the wards and out-patient department of the hospital. The department of otology, rhinology, and laryngology (the Royal Ear Hospital) has been provided with a separate building in Huntley-street, adjacent to the obstetric hospital. It contains 41 beds, including eight private wards for patients of limited means. In the dental school in Great Portland-street there is afforded the opportunity for attending lectures and practical instruction in diseases of the mouth and teeth.

The hospital is equipped with all modern appliances for investigation. The new buildings of the obstetric hospital of 85 beds (rendered possible by the Rockefeller Benefaction), the new residents' house (with accommodation for 30 residents and students), the extension to the nurses' home, and new research laboratories for the medical school are now finished and in full occupation. Twelve women students are admitted annually.

Original research in all subjects can be pursued in the laboratories of the school under the professor of pathology, and students can receive grants under certain conditions from the Charles Graham Medical Research Fund.

Clerkships and dresserships to the physicians, surgeons, anæsthetist, and pathologist are allotted amongst the students of the hospital. Maternity students are appointed each month and reside in the Students' House connected with the medical school and hospital. Sixteen house physicians, ten house surgeons, ten obstetric assistants, four house surgeons to the Royal Ear Hospital are selected annually by examination from among the senior students who have a medical qualification. All house officers reside free in the hospital. In addition to these posts there are certain special appointments which are vacant from time to time and are filled by senior students of the hospital: resident medical officer, surgical registrar, medical registrar, obstetric registrar, Harker-Smith cancer registrar, ophthalmic registrar, registrar to the Royal Ear Hospital, radiological registrar, casualty medical officer and a casualty surgical officer, first assistant in the children's department; assistants in ear, nose and throat, ophthalmic, skin, and venereal diseases departments and in the department of psychological medicine, and house anæsthetist.

Assistants to Medical, Surgical, and Obstetric Units. These salaried appointments are for senior students who may desire to remain at Hospital after holding the ordinary resident appointments continuing clinical work or pursuing laboratory or other research. The salaries range from £250 up to £900 a year, resident quarters being provided only for the chief assistant to the Obstetric Unit. The total number of such assistantships varies from time to time, being generally about 12, and an aggregate sum of about £5000 annually is available for their salaries.

Scholarships and Prizes (those in connexion with University College have already been enumerated).—At this School the first two Scholarships (*a*) and (*b*) entitle the holder to a complete course at University College and University College Hospital Medical School; the second two (*c*) and (*d*) entitle to a final course at the Medical School. The money value and subjects of examination are as follows: (*a*) Entrance Scholarship, Bucknill, 60 guineas, Chemistry, Physics, Botany, and Zoology; (*b*) Epsom Free Medical Scholarship, subjects of Preliminary Scientific Examination and Nomination by Epsom College; (*c*) and (*d*) two Goldsmid Entrance Scholarships entitling the holder to the Final Course of Medical Study, two of the following subjects: Anatomy, Physiology, General Pathology, Biochemistry; (*e*) Goldsmid Entrance Exhibition, entitling the holder to a reduction by £80 in the fees due for the full course of Final Medical Studies, two of the following subjects: Anatomy, Physiology, General Pathology, Biochemistry; (*f*) Filliter Entrance Scholarship, entitling the holder to a reduction by £52 10*s.* in the fees due for the full course of Final Medical Studies. Students need take Pathology alone if they desire to enter for the Filliter Entrance Scholarship only; (*g*) Ferriere Scholarship, value £25; (*h*) Graham Scholarship in Pathology, £300 per annum for two years, awarded by the Senate of the University of London; (*i*) Atkinson Morley Scholarship, tenable for three years, £45 per annum, Surgery; (*j*) Atchison Scholarship, tenable for two years, £55 per annum, General Proficiency in Medical Studies; (*k*) Magrath Clinical Scholarship, about £160, Clinical Cases; (*l*) Percival Alleyn Scholarship, about £110, Surgery; (*m*) Filliter Exhibition, £30, Pathology; (*n*) Erichsen Prize, £21, Practical Surgery; (*o*) two Senior and two Junior Fellowes Clinical Medals for Clinical Medicine; (*p*) two Liston Gold Medals for Clinical Surgery; (*q*) Alexander Bruce Gold Medal for Pathology and Surgery; (*r*) Tuke Silver and Bronze Medals for Pathology; (*s*) Radcliffe Crocker Travelling Scholarship for Dermatology; and (*t*) Leslie Pearce Gould Travelling Scholarship for Surgery. A limited number of Bursaries are available from the Atchison Fund, awarded at the discretion of the Dean, to enable students whose means do not allow to take Resident Posts.

The Museum of Pathological Anatomy is open for study daily. The Anatomical Museum of the University of London, University College, is open to all students of University College Hospital and medical school on the recommendation of the school committee. The library, open daily to every student of the School, contains about 30,000 medical works, including all the current text-books and works of reference.

The Medical Society exists for the dual purpose (1) of promoting the study of medical and surgical science, and (2) of promoting social intercourse among its members. All male students of the medical school are required to become members, and meetings are held once a fortnight for appropriate discussion connected with the study of medicine. The Society includes various athletic clubs and superintends the gymnasium and squash racquet-courts in the medical school, and the athletic ground at Perivale.

In Gower-street there is a well-equipped residential hostel solely for the use of the medical students.

Westminster Hospital

The Hospital contains 241 beds, and has attached to it a Radium Clinic with 22 beds, elaborately equipped for all forms of radium therapy and research. There are separate departments for diseases of the eye, skin, teeth, ear, nose and throat, for orthopædic practice, for diseases of women, for diseases of children, for radiography, for venereal disease, and for massage, electrical, and light treatment. The anatomical, pathological, and materia medica museums are open to all students of the school.

The entire teaching of the hospital is devoted to the subjects of the Final Examinations. Arrangements are made for the tuition required for Preliminary and Intermediate subjects.

Paid appointments as medical, surgical, and obstetric registrars, casualty officers, house physicians, house surgeons, and anæsthetist, are available for students when they have passed their examinations.

There are excellent opportunities for research work in the recently endowed John Burford Carlill Laboratories. Grants to assist research workers are made annually from the John Burford Carlill Endowment.

Scholarships and Prizes.—The following Entrance Scholarships are offered for competition: Winter Session: Two Scholarships in Anatomy and Physiology, £75 each. Summer Session: Two Scholarships in Anatomy and Physiology, £75 each. A certain number of Scholarships have been allotted to Universities of England, Wales, and the Colonies, and to Public Schools. These Scholarships are awarded entirely on the nomination of the principal of the university or school. During the period of study the following prizes may be competed for: Sturges Prize in Clinical Medicine, Reports on Cases; Chadwick Clinical Surgery Prize, Reports on Cases; Chadwick Prize in books or instruments—Medicine and Surgery, including Pathology and Applied Anatomy and Physiology; Frederick Bird Medal and Prize, open to Fourth-year Students, medal and books or instruments—Midwifery, Diseases of Women, Medicine, Pathology, Forensic Medicine and Bacteriology, and Public Health and Toxicology; Abrahams Prize in Clinical Pathology, a paper and tests in practical work; Hanbury Prize in Diseases of Children, 10 guineas; Alfred Hughes Memorial Prize, open to Second-year Students, books or instruments—Anatomy; Huxley Memorial Prize, 3 guineas in books or cash, open to Second-year Students—Physiology; Carter Gold Medal and Prize for Botany, open to Students of not more than three years' attendance, gold medal and books; Jelf Medal awarded to Third-year Students; Daniell Scholarship, £40, Chemistry; Rabbeth Scholarships open to First-year Students; Class Examinations in the Preliminary Scientific Course. Inchley Prize in Pharmacology, open to Students who within two years of passing the first examination for medical degrees have completed the course in Pharmacology. Hare Prize in Zoology, £2 10*s.*, open to First-year Students.

The annual fee includes membership of the Sports Union Club with its various branches—i.e., football, cricket, tennis, boxing, and Guthrie Society. The athletic grounds are situated in Tooting and are reached in 20 minutes from the hospital.

London (Royal Free Hospital) School of Medicine for Women

The Royal Free Hospital contains 321 beds. The Hospital also has large casualty and out-patient departments. A new block has recently been completed to extend the special departments for orthopædic, light, and obstetric and gynæcological out-patients. Maternity districts are attached to the Obstetric Unit operating in the Gray's Inn-road and Essex-road areas. Students also attend the in-patient and out-patient practice of the Elizabeth Garrett Anderson Hospital, Cancer Hospital, Hospital for Sick Children, Great Ormond-street, National Hospital, Queen-square, South London Hospital, and Central London Ophthalmic Hospital. Students after qualification can hold posts at the Royal Free Hospital of house physicians, house surgeons, obstetric assistants, clinical assistants, assistant anæsthetist and pathologist, and medical, gynæcological, and surgical registrars; and the posts of demonstrators in all the departments at the Medical School.

A Clinical Unit in Obstetrics controls 68 beds. The Pathology Unit has been extended and spacious new quarters are now available.

Courses are arranged for the Primary Fellowship Examination of the College of Surgeons.

The School buildings have been entirely rebuilt in recent years, and there are spacious, well-equipped laboratories, which afford every facility for efficiency of teaching and practical work in all departments. Students' Chambers are provided in the neighbourhood of the school and the Warden can be consulted on the subject.

Scholarships and Prizes.—Among the larger of these awards are the following: (*a*) Isabel Thorne and A. M. Bird Scholarships of £30 a year for six years. (*b*) St. Dunstan's Medical Exhibition, £60 a year for three or five years. (*c*) Mrs. George M. Smith Scholarship, £50 a year for three or five years. (*d*) Bostock Scholarship, £90 a year for five years. (*e*) Mabel Sharman-Crawford Scholarship, £20 a year for four years. (*f*) Sir Owen Roberts Scholarship, £75 a year for four years. (*g*) Mabel Webb and A. M. Bird Research Scholarship, £200 for one year. (*h*) Fanny Butler Scholarship, £16 a year for four years. (*i*) Sarah Holborn Scholarship, £20 a year for three or five years. (*j*) Dr. Margaret Todd Scholarship, £37 10*s*. a year for four years. (*k*) Lieutenant Edmund Lewis and Lieutenant Alan Lewis Memorial Scholarship, £25 a year for four years. (*l*) Alfred Langton Scholarships, £35 a year for two years. (*m*) Flora Murray Bursary, awarded every year to a fifth-year student, £50. (*n*) A. M. Bird Clinical Scholarship, £30 a year for three years. (*o*) School Jubilee Bursary, tenable for three years, £50 a year. (*p*) John Byron Bursary, £20 for two years. (*q*) Helen Prideaux Prize and Julia Ann H. Cock Prize, to be spent in assisting the newly qualified holder to further study, £60 each. (*r*) A. M. Bird Post-graduate Scholarship in Pathology, £200 for one year. (*s*) Dr. Edith Pechey Phipson Post-graduate Scholarship of the value of £100, open to all medical women, preferably coming from India or going to work in India. The Dorothy Chick Gift, £20, and other prizes value £84 are awarded annually. The Students' Union arranges the social, athletic, and other clubs and societies.

Inquiries may be addressed to the Warden and Secretary of the Medical School, 8, Hunter-street, London, W.C.

British Post-Graduate Medical School

This school, which will be open to post-graduate students during the academic year 1934–35 at a date still to be determined, is the outcome of joint action by H.M. Government, the University of London, and the London County Council. The School will be run in connexion with the London County Council Hospital at Hammersmith, which has at present some 400 beds, a number which is likely to be increased at a later date. Parliament has voted £100,000 for its new buildings and equipment, and the London County Council is spending a similar sum on additional hospital buildings and equipment in order to improve the supply of clinical materials for teaching.

The School, of which the buildings are now substantially completed, is situated in the grounds of the Hammersmith Hospital at Ducane-road. These grounds cover 14 acres and provide ample room for further building. Ducane-road runs parallel to Western-avenue, to the south of a large area of open ground known as Wormwood Scrubs, which can never be built over. On the west lies the prison, and the extensive plot on the east belonging to St. Clement Danes Grammar School will also remain open.

The Board of Governors of the Post-Graduate School, as prescribed in its Charter, is made up of representatives of various interested bodies, and at present consists of the following 17 members under the chairmanship of Sir Austen Chamberlain, K.G., M.P.:—

Names.	*Nominated by—*
F. C. Goodenough.	Secretary of State for Dominion Affairs.
Lt.-Col. H. R. Dutton, C.I.E., F.R.C.S., I.M.S. (ret.).	Secretary of State for India.
Sir Thomas Stanton, K.C.M.G., M.D.	Secretary of State for the Colonies.
Sir Austen Chamberlain, K.G., M.P.	Minister of Health.
Sir George Newman, K.C.B., M.D.	Minister of Health.
Miss Florence Barrie Lambert, C.B.E., M.B., D.P.H.	London County Council.
L. Silkin.	London County Council.
H. L. Eason, C.B., C.M.G., M.S.	Senate of the University of London.
Prof. G. E. Gask, C.M.G., D.S.O., F.R.C.S.	Senate of the University of London.
Lord Dawson of Penn, G.C.V.O., M.D., P.R.C.P.	Royal College of Physicians of London.
Sir Holburt Waring, C.B.E., P.R.C.S.	Royal College of Surgeons of England.
R. C. B. Wall, M.D., F.R.C.P.	Society of Apothecaries of London.
T. Watts Eden, M.D., F.R.C.P.	Royal Society of Medicine.
Sir Robert Bolam, O.B.E., M.D., F.R.C.P.	British Medical Association.
Sir Frederick N. Kay Menzies, K.B.E., M.D., D.P.H.	Coöpted.
Miss L. Martindale, C.B.E., M.D., B.S. Lond., F.C.O.G.	
H. J. Paterson, C.B.E., F.R.C.S.	

The School has been provisionally recognised as a school of the University of London, and all appointments of Professors and Readers will be made by that body.

It is under consideration to provide facilities for at least three different classes of post-graduate student: (1) students from the Empire and abroad who at present have scarcely any opportunity of sharing in practical work in this country; (2) those who have qualified at one or other of the British undergraduate medical schools and feel a desire for further scientific training; (3) practitioners, especially those from the country, requiring short and highly concentrated refresher courses to keep them in touch with new developments in medicine and surgery.

The new block in which it is proposed to house the medical school consists of three floors around a central courtyard. On the ground floor is the clinical theatre, with seating room for 100 students, directly abutting on the main east-west corridor of the hospital, with a room for a cinema operator on the one side and examination rooms for patients on the other. On the north side of this floor is a very complete pathological department centring around a top-lighted post-mortem room with four tables, attached to which is abundant cold storage. The adjacent mortuary opens on a yard with a separate entrance to the street and completely cut off from the rest of the hospital. Alongside are rooms for histology and photography, and a service lift to take material up to the museum and preparation laboratories on the floor above. On the east side are chemical laboratories with workshops, stores, and centrifuge room; on the west side are the committee room and the offices of the dean and clerical staff. On the first floor are the library and museum, as well as the lecture theatre which lies over and duplicates the clinical theatre below. Here are the laboratories for the professors and a number of other laboratories large and small, with a small refreshment room, an earnest of the restaurant which is one of the desiderata in the next extension. On the second floor is a large animal section with preparation, operating, and post-mortem and infectious rooms, abundant pens and cage accommodation. All this is opening on a flat roof and completely shut off from the rest of the building. On the third floor also are microscopic and other laboratories, with hot rooms and autoclaves.

The following appointments to the School have so far been made and further appointments are receiving consideration : Dean, Dr. M. H. MacKeith ; Professor of Medicine, Dr. F. R. Fraser ; Professor of Obstetrics and Gynæcology, Dr. James Young ; Professor of Pathology, Dr. E. H. Kettle. It is intended that visiting experts shall be invited to conduct special courses from time to time, and that, while ample opportunity for refresher courses is to be provided, advanced workers will find their needs considered.

At the hospital a new surgical and maternity block has been provided and a large out-patient department —this last a novel feature for one of the London County Council hospitals. It is intended to arrange that patients from any of the London County Council's hospitals may be sent to Hammersmith for the purpose of diagnosis and the specialised treatment available there.

The responsibility for the care of patients will continue to rest with the Council, and while the proper duty of the School is teaching the two functions are in practice inseparable, at least with regard to the more senior posts. The School will depend for its main income on a grant from the University Grants Committee administered through London University (which has two representatives on the Governing Body), but will also receive a payment from the Council in respect of services rendered to the hospital, and, in addition, fees will be charged to students attending courses.

UNIVERSITY OF DURHAM

There are two degrees in Medicine, *M.B.* and *M.O.* ; two in Surgery, *M.S.* and *D.S.* The University also gives degrees or diplomas in *Dental Surgery, Hygiene and Public Health*, and *Psychiatry*.

For the degrees of *Bachelor of Medicine* and *Bachelor of Surgery* there are four professional examinations. The subjects of the First Examination are—Elementary Biology and Chemistry in relation to medicine. The subjects of the Second Examination are— Anatomy and Physiology. The subjects of the Third Examination are—Pathology and Bacteriology, Materia Medica, Pharmacology and Pharmacy, Medical Jurisprudence, and Public Health. The subjects of the Fourth Examination are—Medicine, including Therapeutics, Clinical Medicine, Surgery, Clinical Surgery, Operative Surgery, Midwifery and Gynæcology, Psychological Medicine, Diseases of the Skin, of the Throat, Nose, and Ear, and of Children, and Ophthalmology. The University requires that at least three years be spent in residence in the University. In certain cases candidates may obtain exemption from the First and Second examinations, but the later professional examinations must be passed in the University.

For the degrees of *Doctor of Medicine* and *Master of Surgery* a candidate must not be less than 24 years of age. He must have obtained the bachelor degrees of the University, and been engaged for two years subsequently to the date of admission to these degrees in research work, or in attendance on the practice of a recognised hospital, or in the naval or military services, or in medical or surgical practice. The candidate for the M.D. degree may present an essay or undergo a special examination in the subjects of Medical Anatomy, Medical Pathology, and the Principles and Practice of Medicine. The subjects of examination for the M.S. are—Principles and Practice of Surgery, Surgical Pathology, Surgical Anatomy, Surgical Operations, Clinical Surgery.

Doctor of Surgery.—Candidates must be registered medical practitioners, and not less than 25 years of age, and must devote three years, subsequently to obtaining a registrable qualification, to the study of Surgery, one at least to be spent in the University. The course of study of the candidate must be submitted to the Professor of Surgery and approved by the Board of the Faculty. One year shall be devoted mainly to work in the departments of Anatomy, Physiology, Pathology, and Bacteriology, and the candidate must submit evidence of having so worked. Not less than six months of another year must be spent as resident surgeon in a recognised teaching hospital, and the rest of the year in the study of surgery in a recognised medical centre. Not less than six months of one of the three years must be spent in surgical study abroad.

Candidates must give six weeks' notice of entry for all examinations to the Secretary of Examinations, University of Durham College of Medicine. The M.D. (essay) must be sent in before April 1st.

Scholarships and Prizes.—The following are awarded : University of Durham Entrance Scholarship, £25 a year for four years ; Pears' Entrance Scholarship, £40 a year for three years (awarded every third year) ; Heath Entrance Scholarship (from Kepier Grammar School), £60 (renewable) ; Province of Durham Masonic (Entrance) Scholarship, £60 (renewable) ; Heath Scholarship for Surgery, £200, available every second year ; Rutherford Morison Surgical Scholarship, £180, available every third year. Approved applicants may obtain special grants for surgical research from the Stephen Scott Research Fund.

The following Scholarships are tenable for one year, namely : Tulloch Scholarship for Elementary Biology and Organic Chemistry, £20 ; Dickinson Scholarship for Medicine, Surgery, Midwifery, and Pathology, £20 ; Charlton Scholarship for Medicine, £25 ; Gibb Scholarship for Pathology, £28 ; Luke Armstrong Scholarship for Comparative Pathology, £25 ; Stephen Scott Scholarships for Anatomy and Physiology, two of £50 each ; Philipson Scholarships for highest marks in Final M.B., B.S. Examinations, two of £45 each ; Goyder Memorial Scholarship for Clinical Medicine and Clinical Surgery, interest on £325 ; Hamilton Drummond Memorial Scholarship, in aid of research in Clinical Surgery, about £50 ; Gibson Prize for Midwifery and Diseases of Women and Children, £10 ; Turnbull Prize and Silver Medal for Surface Anatomy ; and Outterson Wood Prize for Psychological Medicine, £10 ; Sewell Memorial Prize and Silver Medal for Clinical Pathology.

Newcastle-upon-Tyne : College of Medicine

Hospital practice and post-graduate work are carried out at the Royal Victoria Infirmary, a general hospital containing 700 beds, and there are facilities for the study of the various special subjects. Post-graduate work can be pursued at the Newcastle General Hospital.

Practical midwifery can be studied at the Princess Mary Maternity Hospital, which contains 90 beds, with an annual indoor and outdoor attendance on 3000 cases.

Psychological medicine can be studied at the Newcastle Mental Hospital, and infectious diseases at the City Hospital, under the M.O.H. of the city.

The bacteriological laboratory is adjacent to Armstrong College.

Post-graduate Instruction.—1. General courses in Clinical Medicine, Surgery, and Pathology at the Royal Victoria Infirmary, meeting once weekly for ten weeks. One course is held from October to December and one from April to June. 2. Special courses of clinical instruction, meeting once weekly for ten weeks, in the following subjects: Gynæcology; Diseases of the Eye; Diseases of the Throat, Nose, and Ear; Diseases of the Skin; Venereal Diseases; Neurology; Diseases of Children; Electrotherapeutics and Radiology; special courses in Midwifery are held at the Princess Mary Maternity Hospital. 3. An intensive course of 14 days' duration in the Summer Vacation. 4. In addition to the regular post-graduate courses practitioners may attend the ordinary medical and surgical practice of the Royal Victoria Infirmary, also at the Princess Mary Maternity Hospital for specified periods, and for clinical instruction at Newcastle General Hospital.

There is a well-furnished Students' Union for the students of the Newcastle Division of the University, and special accommodation has been provided for women students.

The clinical work is done mainly at the

Royal Victoria Infirmary

The Infirmary has over 700 beds. Clinical lectures are delivered by the physicians and surgeons weekly and ward demonstrations are given daily. Tutorial classes are given by the assistant physicians, assistant surgeons, the medical and surgical registrars, and the assistant to the gynæcological department, and demonstrations are given in the several out-patient departments daily. Pathological demonstrations are given by the pathologist daily or as opportunity occurs. In addition to medical and surgical in-patient and out-patient departments the following special departments are fully equipped for teaching: ophthalmic, throat, nose, and ear, skin, and venereal disease, gynæcological, orthopædic, and electrical. The hospital building contains the following laboratories: 1. Special pathological laboratories attached to the post-mortem rooms. 2. Bacteriological laboratory in which all clinical bacteriological investigations are carried out. 3. There is in addition a clinical laboratory attached to each ward and to the out-patient department. There are five operating theatres in use in the hospital. The winter session of 1934 opens on Oct. 2nd, and the summer session of 1935 on April 17th. Applications for detailed information should be made to the Sub-Dean, Dr. Horsley Drummond, at the hospital.

Appointments of assistants in the pathological and other special departments and of clinical clerks and dressers are made periodically. Resident appointments are also made every six months; and each year medical and surgical registrars (who also act as tutors) are appointed from candidates who have previously held resident appointments at any recognised hospital. These latter posts afford an excellent opportunity for post-graduate study, not only at the Infirmary, but also in the departments of anatomy, physiology, pathology, and bacteriology of the college.

UNIVERSITY OF BIRMINGHAM

The University of Birmingham grants the degrees of *M.B.*, *Ch.B.*, *M.D.*, *Ch.M.* There is also the degree of *Ph.D.* (for *Research Study*), and a degree and a diploma in *Public Health*. The Senate may recognise attendance at other Universities as qualifying for these degrees and these examinations passed at Universities as exempting from the examinations in Physics, Chemistry, Biology, and Organic Chemistry; but at least three years must be spent in attendance upon classes in the University. The final year may be spent at any other medical school recognised by the University.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—The student must have passed the Matriculation Examination of the Joint Board or an examination accepted in lieu thereof. Before commencing the study of Anatomy and Physiology, examinations in Chemistry and Physics and Biology must be passed (First M.B., Ch.B.), or examinations in lieu thereof. All communications respecting the Matriculation Examination, and examinations accepted in lieu thereof, must be sent to the Secretary, Joint Matriculation Board, 315, Oxford-road, Manchester. Second Examination.—Part I., Organic Chemistry; Part II., Anatomy and Physiology. Third Examination.—General Pathology and Bacteriology. Fourth Examination (at the end of the fifth year).—Forensic Medicine and Toxicology; Public Health; and Materia Medica, Pharmacology, and Therapeutics. Two years' hospital work must have been accomplished. Final Examination.—Medicine, Surgery, Midwifery and Diseases of Women, Mental Diseases, and Ophthalmology. Attendance at a general hospital for a year after the passing of the fourth examination will be required, also attendance at a fever hospital three months, maternity hospital three months, and mental hospital three months. Vaccination instruction must be taken and courses of Ophthalmology, Venereal and Skin Diseases, and Diseases of Ear, Nose, and Throat, Medical and Surgical Anatomy, and Operative Surgery. Distinctions may be awarded in the subjects (severally) of the Second, Third, Fourth, and Final; and First- and Second-Class Honours in the Final Examination.

Degrees of Doctor of Medicine and Master of Surgery. One year after having passed the final M.B., Ch.B. examination the candidate can present himself for these higher degrees. They present a thesis on some medical or surgical subject, and pass a general examination in Principles and Practice of Medicine for the M.D. and one in Principles and Practice of Surgery, including operations on the cadaver, for the Ch.M., or, at the discretion of the examiners, in a special branch of Medicine or Surgery respectively. A thesis of exceptional merit may exempt from any part of these examinations, in which Honours may be awarded.

Degree of Ph.D.—Candidates must possess a medical degree of a British, Colonial, or other university approved of by the Senate of the University, and have been engaged as a rule in advanced study for two years, either in a laboratory of the University or in one or more of the hospitals associated with the University. But under approved conditions after the first year research may be carried on elsewhere, when, on completing the course, candidates present a thesis and submit themselves for oral and possibly written examination.

Scholarships and Prizes.—The following are awarded:—Entrance Scholarships: (*a*) Frank Fletcher and Catherine Fletcher Scholarships of £100 per annum each, for five years. Two or more offered annually; open to men and women students under certain prescribed conditions as to residence, &c.; (*b*) Sydenham Scholarship of £42, tenable for three years, award of Council to orphan sons of medical practitioners; (*c*) Sands Cox Scholarship of £21 per annum during two years, awarded to the candidate, not being more than 19 years of age, taking the highest marks at the Higher School Certificate Examination of the Joint Matriculation Board; (*d*) Dental Scholarship of £46 17*s.* 6*d.*, Open Competitive Examination in subjects learned during apprenticeship; (*e*) Myers Travelling Studentship of £300, tenable for one year, offered in alternate years, awarded by vote of committee to M.B., Ch.B. candidates, tenable at some University or Hospital not in Great Britain or Ireland; (*f*) two Ingleby Scholarships of £10 each awarded to the candidates at Final Examination obtaining highest marks in the subjects of Midwifery and Diseases of Women; (*g*), (*h*), (*i*), and (*j*) Four Queen's Scholarships of £10 10*s.* each, awarded to the candidate taking the first place in the Second, Third, Fourth, and Final Examinations respectively, provided that the candidate's work is sufficiently distinguished; (*k*) Priestley Smith Prize in Ophthalmology, value about £6 10*s.*, is awarded annually to the student passing the Final M.B., Ch.B. Examination on first entry who shows the best knowledge of Ophthalmology, provided the Examiners deem him worthy of this distinction; (*l*) George Henry Marshall Scholarship of £10, awarded annually, for the encouragement of Research Work in Ophthalmology; and (*m*) Russell Memorial Prize, a prize of books, value about £2, awarded annually to the Student who, not being of more than six years' standing as a student of the School of Medicine of the University, shall pass the best examination in the subject of Nervous Diseases. The "Arthur Foxwell Memorial Medal" (Gold Medal) is awarded annually to the candidate taking the highest place in Clinical Medicine and passing the Final M.B., Ch.B. Examination in June; the "Sampson Gamgee Memorial Medal" (Gold Medal for Surgery) is awarded annually to the best candidates passing Final M.B., Ch.B. Examination in June in Surgery (paper, oral, and clinical); Peter Thompson Prize for Anatomy (Third Year); and John Barritt Melson Gold Medal for Physiology (Third Year). The University Clinical Board awards Gold and Silver Medals on examinations in Medicine, Surgery, and Midwifery, respectively, in fourth and fifth years, open to all students.

Post-graduate Instruction.—A "William Withering Lectureship" has been established. Courses of lectures are given annually for post-graduates on subjects chosen from year to year. Post-graduate courses of clinical demonstrations for general practitioners are arranged annually by the University Clinical Board (April to July) at the Birmingham General, Queen's, and Children's Hospitals.

The students receive clinical instruction by attending the amalgamated practice of the General Hospital, Queen's Hospital, Maternity Hospital, Children's Hospital, Birmingham and Midland Eye Hospital, Mental Hospital, and Fevers Hospital, under the direction of the University Clinical Board. Appointments are open to students varying from £40 to £200 a year.

Queen's Hospital

There are 330 beds. Ward rounds and out-patient clinic classes are held daily, and regular tutorial classes throughout the session. Post-graduate courses arranged by the University are conducted every year. There are special departments in gynæcology, diseases of the eye, of the ear, nose, and throat, dentistry, radiology, pathology, bacteriology, biochemistry, physiotherapy, electrocardiography, and there is a psychiatric clinic associated officially with the Birmingham Mental Hospitals. There are also large wards for midwifery and postnatal cases, a nursery for instruction in infant welfare, an extensive midwifery district, and residential facilities for students. There are 23 resident appointments (inclusive of registrars) available each year for recently qualified students.

Birmingham General Hospital

There are 487 beds. Special wards for children, gynæcological, ear and throat, venereal, and radium cases; special beds for eye and skin cases. Laboratories for bacteriology, biochemistry, cancer research, and morbid histology. Separate rooms adjoin the medical and surgical wards for clinical pathology. Six operating theatres (one for out-patients and one for casualty department, which is a separate department), are all of them fitted on modern lines. In addition to clinical teaching given in the wards and out-patient department by the honorary staff, medical and surgical tutorial classes are held for senior and junior students. Clinical instruction in all the special departments, which include those for radium, electrotherapy, electrocardiographic investigation, and venereal diseases. Post-graduate classes are held in every branch of medicine and surgery. The Jaffray Branch Hospital contains 61 beds.

UNIVERSITY OF LIVERPOOL

The degrees in the Faculty of Medicine are Bachelor of Medicine and Bachelor of Surgery (*M.B.* and *Ch.B.*), Doctor of Medicine (*M.D.*), Doctor in Philosophy (*Ph.D.*), Master of Surgery (*Ch.M.*), Master of Hygiene (*M.H.*), and Master of Orthopædic Surgery (*M.Ch.Orth.*). There is a diploma in *Medical Radiology and Electrology.*

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates for the degrees of Bachelor of Medicine and of Surgery must have attained the age of 22 years on the day of graduation. At least two of the six years of medical study must have been passed in the University, and one year at least must have been passed in the University subsequently to the date of passing the First Examination. The other three years may be passed at any college or medical school recognised for this purpose by the University. Candidates must pass three examinations entitled respectively: the First Examination, the Second Examination, and the Final Examination. The subjects of the First Examination are: (1) Chemistry; (2) Biology (Zoology and Botany); (3) Physics. The subjects of the Second Examination are: (1) Anatomy; (2) Physiology (including Biochemistry and Histology). The subjects for the Final Examination are: (1) (*a*) Pathology, (*b*) Pharmacology and General Therapeutics; (2) (*a*) Forensic Medicine and Toxicology, (*b*) Public Health; (3) (*a*) Obstetrics and Diseases of Women, (*b*) Surgery, Systematic, Clinical, Operative, and Practical, including Ophthalmology, (*c*) Medicine, Systematic and Clinical, including Therapeutics, Mental Diseases, and Diseases of Children. Candidates may take Parts (1), (2), and (3) separately, provided that they do not present themselves for Part (3) until they have completed the sixth year of medical study and have passed the examination in Parts (1) and (2).

Degrees of Doctor of Medicine and Master of Surgery. No candidate will be admitted to the degree of Doctor of Medicine or Master of Surgery unless he has received the Degrees of Bachelor of Medicine and Bachelor of Surgery (Liverpool), and at least two years have elapsed since he passed the examinations for those degrees. Candidates may also take the degree of Doctor of Medicine by examination after five years from taking Liverpool M.B., Ch.B. in (*a*) Medicine, and (*b*) a selected branch of Medicine. Candidates for the degree of Doctor of Medicine, who elect to present a thesis, are required (*a*) to present a thesis, acceptable to the Faculty, and certified to be the candidate's own work, together with (if the candidate desires) copies of published original papers upon Medical Science; (*b*) to present themselves for an oral examination on the subject of the thesis.

The subjects of examination for the Degree of Master of Surgery are: Surgery, Clinical Surgery, Operative Surgery, Surgical Pathology and Bacteriology, and Surgical Anatomy.

Degree of Master of Orthopædic Surgery.—May be conferred on graduates in Medicine of Liverpool or other approved University and graduates of a Faculty other than Medicine of Liverpool or other approved University who are Fellows of the Royal College of Surgeons of England, Edinburgh, or Ireland, or of the American College of Physicians.

The University also awards Diplomas in Medical Radiology and Electrology, Public Health, Tropical Medicine, and Tropical Hygiene.

Scholarships, Fellowships, and Prizes.—The following are awarded: (*a*) Robert Gee Entrance Scholarship (Men), annually, of £42 10*s.*, tenable for four years; (*b*) Junior Lyon Jones Scholarship, of £19 per annum, tenable for two years, on results of First M.B. Examination; (*c*) Senior Lyon Jones Scholarship, of £19, Competitive Examination on results of Professional Examination in Anatomy and Physiology; (*d*) Derby Exhibition of £15, Competitive Examination in Clinical Surgery; and (*e*) Clinical School Exhibition of £15 in Clinical Medicine; (*f*) University Scholarship of £50 for one year, awarded on results of the Final (Part I.) Examination for the degrees; (*g*) Holt Fellowships, Physiology and Pathology, of £150 each, for one year; (*h*) Gee Fellowship, Anatomy, of £100, for one year; (*i*) John Rankin Fellowships in Anatomy, two, each of the value of £120, tenable for two years; (*j*) Johnston Colonial Fellowship, Biochemistry, of £100, for one year; (*k*) John W. Garrett International Fellowship, Bacteriology, of £100, for one year; (*l*) Thelwall Thomas Fellowship, Surgical Pathology, of £150, for one year; (*m*) Ethel Boyce Fellowship in Gynæcology, of £100, for one year; (*n*) Mary Birrell Davies Memorial Fund Scholarship, of the value of £60, tenable for four years, offered for competition in alternate years; open only to women students who will have attained the age of 19 on the first day of October in the year of the award; (*o*) Rankin Exhibition in Practical Anatomy, of £23, for one year; (*p*) Lady Jones Research Fellowship in Orthopædic Surgery, £200; (*q*) Samuels Memorial Scholarships, three at £27; (*r*) Ridgway Research Scholarship (£94); (*s*) T. J. Hughes Research Scholarship (£72); numerous prizes and medals.

The Medical School.—All the laboratories and classrooms are situated close together, communicating with one another, and are made up of four large blocks of buildings which form one side of the College quadrangle. There are the Johnston Laboratories for Biochemistry; the Medical School for Anatomy, Surgery, Toxicology, and Ophthalmology; and the Thompson-Yates Laboratories for Physiology and Pathology. There is also a separate building for Tropical Medicine and Public Health. Medical research has also been endowed with several new laboratories in which students can pursue research work after graduation.

Clinical Studies.—The Clinical School of the University consists of four general hospitals—the LIVERPOOL ROYAL INFIRMARY, the DAVID LEWIS NORTHERN HOSPITAL, the LIVERPOOL ROYAL SOUTHERN HOSPITAL, and the LIVERPOOL STANLEY HOSPITAL; and of five special hospitals—the Eye and Ear Infirmary, the Women's Hospital, Liverpool, Liverpool Maternity Hospital, the Royal Liverpool Children's Hospital, and St. Paul's Eye Hospital. These hospitals contain in all a total of about 1500 beds. The organisation of these hospitals to form one teaching institution provides the medical student and the medical practitioner with an extensive field for clinical education and study. All the hospitals are within easy access of the University. There are a large number of appointments to house physicianships and surgeonships both at the general and special hospitals which are open to qualified students of the school.

Public Health Department.—This is located in a separate building, in which full courses of instruction are given to students for the Diplomas and Degrees of the University and of other Examining Boards.

Prospectuses and further information may be had on application to the Dean of the Faculty of Medicine, University of Liverpool.

UNIVERSITY OF MANCHESTER

Four degrees in Medicine and Surgery are conferred by the Victoria University of Manchester—viz., Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.). A Diploma in Psychological Medicine, a Diploma in Public Health, a Diploma in Bacteriology, and a Diploma in Pathology are awarded by examination to registered medical practitioners.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Before admission to the degrees of M.B. and Ch.B. candidates are required to present certificates that they will have attained the age of 21 years on the day of graduation, and that they have pursued the courses of study required by the University Regulations during a period of not less than five and a half years subsequently to the date of their registration by the General Medical Council, two of such years having been passed in the University subsequently to the date of passing the first M.B. Examination.

The First Examination: (1) Chemistry and Physics; (2) (*a*) Botany, (*b*) Zoology. Candidates must have attended the prescribed courses both of lectures and of laboratory work in each of the above-named subjects. The Examination is divided into two parts: Part 1, Inorganic and Elementary Organic Chemistry and Physics; Part 2, (*a*) Botany, (*b*) Zoology. The candidates sit for these parts separately. The Second Examination: (1) Anatomy and Histology; (2) Physiology, including Physiological Chemistry. Both parts must be passed simultaneously. The Third Examination: (1) Pharmacology and Materia Medica; (2) Pathology and Bacteriology. The Final Examination: (1) Medicine, Systematic and Clinical (including Mental Diseases and Diseases of Children); (2) Surgery, Systematic, Clinical, and Practical; (3) Obstetrics and Gynæcology (including Clinical and Practical); (4) Forensic Medicine; (5). Hygiene and Preventive Medicine. The Final Examination is divided into two parts: Part I., Forensic Medicine, Hygiene and Preventive Medicine; Part II., Medicine, Surgery, Obstetrics and Gynæcology (Systematic, Clinical, and Oral). The two parts of the Final Examination must each be passed as a whole. Candidates for the Second Part must have completed the sixth year of medical study.

Degree of Doctor of Medicine.—Candidates are not eligible for the degree of Doctor of Medicine unless they have previously obtained the degrees of Bachelor of Medicine and Bachelor of Surgery of this University, and at least one year has elapsed since they passed the examination for those degrees. Candidates may elect either (1) to present an original dissertation; or (2) to undergo an examination. The dissertation must embody the results of personal observation, or original research, either in some department of medicine or of some science directly relative to medicine. The examination, which will be written and practical, is in the Principles and Practice of Medicine, in Pathology, and in some other subject to be selected by the candidate.

Degree of Master of Surgery.—Candidates are not eligible for the degree of Master of Surgery unless they have previously obtained the degrees of Bachelor of Medicine and Bachelor of Surgery of this University, and at least one year had elapsed since they passed the examination for those degrees. The degree is conferred in the following branches: Surgery (Branch I.), Gynæcology (Branch II.), Ophthalmology (Branch III.), Laryngology, Otology, and Rhinology (Branch IV.).

Degrees of B.Sc. and M.Sc.—The ordinary degree of B.Sc. in the Schools of Anatomy and Physiology may be obtained by students in Medicine who in their third year of study for the degree of M.B., Ch.B., complete the additional courses in these subjects prescribed for this degree. Candidates for the Honours degree of B.Sc. in Anatomy or Physiology, who are students in Medicine, are required to attend courses in advanced Anatomy and Physiology for four terms after passing the Second Examination for the degrees of M.B., Ch.B. Graduates in science may proceed to the degree of M.Sc. by presentation of an approved thesis.

Diplomas: 1. The following are available for candidates holding a registrable qualification in medicine, surgery, and midwifery; examinations are in two parts in each diploma and are written, oral, and practical. Candidates may present themselves for Parts I. and II. separately or at the same time provided that no candidate be admitted to Part II. unless he has already passed in Part I. No candidate's name will be published until he has satisfied the examiners in both parts of the examination:—

(*a*) *Diploma in Psychological Medicine.*—Part-time course: extending over three University terms, two of which must be spent at the University. Six months' residence must be spent at a recognised Hospital for Mental Diseases.

(*b*) *Diploma in Public Health.*—The course extends over twelve calendar months at least: Part I. of the examination is held in June and October, and Part II. in March and October. Instruction for at least one of the parts must be taken out at the University.

2. *In Veterinary State Medicine.*—Length of course, three University terms. Candidates must be members of the Royal College of Veterinary Surgeons.

3. *In Bacteriology.*—For candidates who have graduated either in science or medicine, or obtained other approved qualification. Length of course, one academic year. A satisfactory thesis on an approved subject must be presented.

4. *In Pathology.*—For candidates who have obtained a registrable medical qualification or other qualification approved by the Senate. Length of course, one academic year. A satisfactory thesis on an approved subject must be presented.

Scholarships, Fellowships, and Prizes.—The following are offered in connexion with medical study at the Victoria University:—Scholarships: Dreschfeld Entrance (triennial), £20; John Russell Medical Entrance, £45; Sam Gamble Entrance for Women; Graduate Entrance (fees up to 160 guineas); two Dauntesey Medical Junior, £50 each; Dauntesey Medical Senior, £50; Professor Tom Jones Exhibition in Anatomy, £25; Dickenson Trust Scholarships in Anatomy and Pathology; Platt Physiological, £90; Graduate Research Scholarship, £70; Dickenson Trust Travelling Scholarships in Medicine and Surgery; Ashby Memorial in Diseases of Children (triennial), £100; Holt Post-Graduate Medical Scholarship for Women, £60; Elected Research Studentships. Fellowships: Leech Research, £70; Professor Tom Jones, Surgical, £105; Morrison Watson in Anatomy, £150; John Henry Agnew in Diseases of Children, £120; Delépine in Preventive Medicine (biennial), £300; Pilkington Fellowship in Cancer Research, £300; Knight Fellowship in Psychological Medicine; Honorary Research Fellowships. Prizes: Sidney Renshaw in Physiology—Junior £10, Senior £20; Wild Prize in Pharmacology, £10; Turner Medical, two prizes each of 10 guineas; Dumville Surgical, £15; John Henry Agnew in Diseases of Children, £30. There are many general entrance scholarships, in addition to those already mentioned, open for competition, the examinations for which are held in the month of May. Full particulars can be obtained from the Registrar.

The Medical School.—This school, largely extended in 1920, is provided with dissecting-rooms, X ray rooms, physiological laboratories, private laboratories, and work-rooms, besides lecture-rooms, museums, and general and departmental libraries. A special laboratory is equipped for experimental work on the central nervous system. In the pathological laboratories (now removed to special buildings close to the Royal Infirmary) ample provision is made for the teaching of pathology and bacteriology and for the prosecution of original research. The Helen Swindells Laboratory is specially equipped as part of a new department for investigation in cancer. Ample facilities for investigation are provided in Anatomy, Physiology, and Materia Medica; new Pharmacological Laboratories were recently added. In the public health department, which is lodged in a separate institute in York-place, near the Royal Infirmary, suitable laboratory accommodation is provided for the study of sanitary chemistry, physics, and practical bacteriology in the departments of chemistry and physics and in that of pathology.

Clinical Studies.—The clinical and practical departments of medical study are taught partly in the medical school of the University and partly in the Royal Infirmary and St. Mary's Hospitals for Women and Children, a fever hospital, mental hospitals, a convalescent home, and other special hospitals

A residential Hostel for final year students will be opened shortly in proximity to the University, where accommodation will be available also for a few graduates.

The Manchester Royal Infirmary, near the University, has accommodation for 640 beds (including 54 beds at the Central Branch). Associated with the Infirmary are: (1) the Convalescent Hospital at Cheadle, containing 132 beds; and (2) the Central Branch in the City, which has accommodation for 54 patients. The Associated Hospitals thus contain 772 beds and are under the same management. The medical side consists of four units, each unit having a testing-room for the scientific investigation of morbid products and a class-room. The surgical beds are arranged in five units, each unit having its own operation theatre, with anæsthetising, recovery, sterilising, testing, and apparatus rooms, and its own class-room attached. One of the surgical units is assigned to orthopædic and neurosurgical cases. The gynæcological, aural, and out-patient departments each have their own operating theatre. Bacteriological investigations are carried out in a special clinical laboratory. A department for the study of heart disease, with an electric cardiograph and other instruments for research, diagnosis, and teaching purposes is attached to the medical wards. There is also a laboratory for clinical research. The X ray department has nine separate X ray outfits for different purposes, and one large room is put aside specially for X ray demonstrations and teaching purposes. A large massage school is also connected with this department. Women students are admitted on the same terms as men. Two Entrance Scholarships in Medicine of the value of £160 each are offered annually by the Council of the Manchester University and the Medical Board of the Manchester Royal Infirmary for proficiency in Arts and Science subjects respectively. All the usual appointments may be held by those who have attended the practice of the Infirmary.

The Royal Manchester Children's Hospital at Pendlebury contains 190 beds and 30 in the Convalescent Home, Lytham St. Anne's. Clinical instruction is given by the medical staff at the Hospital and Dispensary, Gartside-street, Manchester. There is a massage and electrotherapeutic department, also an artificial sunlight department. Clinical assistants are appointed for periods of six months. There is an orthopædic department, out-patients for which are seen at Gartside-street, and a ward at Pendlebury is devoted to those cases needing operative treatment.

Ancoats Hospital, Manchester, is a general hospital of 120 beds and a Convalescent branch which is situated at Great Warford, Alderley Edge, Cheshire, and has 35 beds.

The medical side consists of three units under the care of three honorary physicians with three out-patient clinics of consultative nature. A cardiographic department is under the care of one of the physicians. Much work is done in gastro-enterology, neurology, and diseases of the blood. The surgical units are four in number, each under the care of an honorary surgeon; the orthopædic department, which deals with all fractures and bone injuries, is very large. One surgical unit is devoted to abdominal surgery, and one is devoted to oto-rhino-laryngology, while a urological department is under the care of one of the honorary surgeons. All these units have a largely attended out-patient department. Clinical teaching is given both to under-graduate and post-graduate Students in all the out-patient clinics which are free to them, and in the wards, while special courses of post-graduate lectures are given as part of the Manchester University post-graduate scheme. Clinical assistantships are available for post-graduates.

There are six resident appointments which are open to men and women graduates. There are also four registrar appointments, part-time: medical, surgical, orthopædic and laryngological made annually.

UNIVERSITY OF LEEDS

Four degrees in Medicine and Surgery are conferred—viz.: Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), also Degrees and Diplomas in Dental Surgery and Diplomas in Public Health and in Psychological Medicine. Courses and Degrees in the Faculty are open to men and women alike.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates for these degrees are required to present certificates showing that they will have attained the age of 21 years on the day of graduation, and have attended courses approved by the University extending over not less than five years, two of such years at least having been passed in the University, one of which must be subsequent to the date of passing the First Examination. Candidates must also satisfy the examiners in the several subjects of the following examinations, entitled respectively: the Matriculation Examination, or such other examination as may have been recognised by the Joint Matriculation Board in its stead; the First Examination; the Second Examination; and the Final Examination. The First Examination consists of: Part I., Physics and Inorganic Chemistry; Part II., Organic and Physical Chemistry; Part III., Botany; Part IV., Zoology. Candidates will be allowed to pass the parts separately. The Second Examination consists of: Part I., Materia Medica and Practical Pharmacy; Part II., Anatomy and Physiology. Candidates will be allowed to pass either part separately. The Final Examination consists of: Part I., Pharmacology, Pathology, and Bacteriology; Part II., Medicine, Surgery, Obstetrics and Gynæcology; Part III., Forensic Medicine, Public Health, and Therapeutics. Part I. may be taken at the end of the second clinical year, and Parts II. and III. may be taken at the end of the third clinical year, but not before the completion of the fifth year of medical study. If taken separately Part III. may not be passed before Part II.

Degree of Doctor of Medicine and Master of Surgery. Candidates are not eligible for the degree of Doctor of Medicine or Master of Surgery unless they have previously received the degrees of Bachelor of Medicine and Bachelor of Surgery of the University (or of Victoria prior to December, 1904) and at least two years' Hospital Practice or four years' other professional practice for the former and one year has elapsed for the latter since they passed the examination for those degrees. Candidates for the degree of Doctor of Medicine may present a dissertation and, if the dissertation is considered to be of exceptional merit, will not be required to pass an examination. The first term commences on Oct. 1st. Prospectus can be obtained from the Academic Sub-Dean.

Post-graduate work.—Practitioners wishing to attend Infirmary practice during short periods, or post-graduate classes held by members of the clinical staff, may do so an application to the Clinical Sub-Dean, from whom particulars may be obtained.

The Scholarships and Prizes, in order of importance, are: (1) medical scholarship, value £130; (2) Infirmary scholarship, value £75; (3) the Littlewood prize, value about £50; (4) West Riding Panel Practitioners, prize value, £25; and (5) the William Hey gold medal. The last is generally awarded to a young graduate who figures in the other prizes and sentimentally may be considered of first importance.

Clinical Studies.—The clinical studies are pursued mainly at the LEEDS GENERAL INFIRMARY AND WOMEN'S HOSPITAL, which has accommodation for 694 in-patients, including 88 beds at branch hospitals in the country. Clinical teaching takes place daily in the wards, in medicine and surgery. There are medical, surgical, ophthalmic, aural, electrotherapeutic, and radiographic departments, in each of which special instruction is imparted to students. Gynæcological and children's departments, together with laryngeal, venereal, and skin clinics, are in operation, and there is a special ward for cases of nutritional disorders of children.

In addition to work in the General Infirmary, clinical instruction in obstetrics is given in the Leeds Maternity Hospital and in mental and infectious diseases in the Wakefield (W.R.) Mental Hospital and Leeds City Fever Hospital respectively.

The General Infirmary.—This hospital has accommodation for 694 beds which are allotted, 300 to general medical and surgical cases, adults and children, the remainder being given up to ophthalmic, aural, orthopædic, and a few gynæcological cases. In that total is included the patients in the semi-convalescent branch hospitals, the Ida and Robert Arthington, containing 96 beds. The University and hospital paid appointments in connexion with the Infirmary and other bodies are numerous. Connected also with the Infirmary is the Women's Hospital of 66 beds for the treatment of gynæcological and obstetric diseases; students when eligible attend the practice of this hospital, to which there are four resident appointments attached whose holders receive honorariums.

Leeds Maternity Hospital contains 126 beds for cases of labour, while there is other accommodation attached for the treatment of morbid pregnancies. There is an X ray department, and large extern districts are centred upon the institution. The hospital is affiliated to the University for purposes of clinical training, and every student takes an obstetric clerkship and attends in the intern and extern departments. During the second and third months personal contact with not less than 20 cases of labour is required, the students being resident in the neighbouring hostel.

West Riding Mental Hospital.—The well-known hospital at Wakefield accommodates 2400 patients, a separate building, containing 360 beds, being provided for the treatment of acute insanity, while mentally deficient children are accommodated in separate homes in juxtaposition. Clinical clerkships in the wards and laboratories can be filled by qualified practitioners or, on application to the medical director, by senior students.

UNIVERSITY OF SHEFFIELD

The Degrees in the Faculty of Medicine are Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.), Bachelor of Dental Surgery (B.D.S.), and Master of Dental Surgery (M.D.S.). There is also a Diploma of Licentiate in Dental Surgery. The courses and degrees in the Faculty of Medicine are open to men and women alike. Candidates must matriculate in the University or pass such other examination as may be recognised for this purpose by the University and sanctioned by the Joint Matriculation Board, and must pass also the further examination in Chemistry and Physics.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—A candidate must have attained the age of 22 years on the day of graduation, and have pursued the courses of study required by the University regulations during a period of not less than five and a half years subsequently to the date of his matriculation, three of such years at least having been passed in the Faculty of Medicine of the University one at least being subsequent to the passing of the Second Examination. The subjects of the First Examination are Chemistry, Physics, and Biology. Candidates must, in addition to matriculation, pass a preliminary examination in Physics and Chemistry before taking the First Examination, for which they must have attended courses of instruction (lectures and laboratory work) in Chemistry, Physics, and Biology for one year each. Students who before entry have attained a standard in Chemistry and Physics approved by the Faculty of Medicine have the opportunity of working for the degree of B.Sc.

(with honours) in Physiology concurrently with their work for the degree of M.B., Ch.B. The Second Examination: Candidates must have attended courses of instruction in Physiology (first part) for one year, and in Anatomy for five terms. The Third Examination: Candidates must have attended courses of instruction in Pathology for five terms, in Pharmacology for four terms (and one term in Pharmacy), in Applied Anatomy for four terms, and in Physiology (second part) for six terms. The Final Examination: The subjects are, Part I., Forensic Medicine and Public Health. Candidates must have attended courses for one term in each subject; Part II., Medicine (including Mental Diseases, Diseases of Children, and Vaccination), Special Pathology (including Morbid Anatomy and Clinical Pathology), and Therapeutics; Part III., Surgery (including the administration of Anæsthetics, Diseases of the Ear, Nose, and Throat, Ophthalmology, and Surgical Pathology), and Obstetrics and Gynæcology, including Antenatal and Postnatal practice and Infant Hygiene. Candidates for Parts II. and III. must have completed a minimum of five and a half years of approved study.

Degree of Doctor of Medicine.—Candidates for the degree of Doctor of Medicine must have passed the examination for the degrees of M.B., Ch.B. at least three years previously, must present a thesis embodying observations in some subject approved by the professor of medicine, and must pass an examination in the Principles and Practice of Medicine.

Degree of Master of Surgery.—Candidates must have taken the M.B., Ch.B. at least three years previously, and must since have held for not less than twelve months a surgical appointment in a public hospital.

The subjects of examination are Systematic, Clinical, and Operative Surgery, Surgical Anatomy, Surgical Pathology and Bacteriology.

Scholarships and Prizes.—The following scholarships are offered: Four Town Trustees scholarships offered annually, each of the value of £50 per annum for three years. Medical: offered annually, covers cost of tuition for a degree course in the Faculty of Medicine. Six Edgar Allen, offered annually, each of the value of £100 per annum for three years. Post-graduate: Frederick Clifford scholarship, value £50 per annum, tenable for two years. Mechanics' Institute scholarship, value £50 for one year with free admission to those University courses taken by the holder in connexion with his work, renewable for a second year. Town Trustees fellowship, value £75 for one year. Medals and Prizes: Kaye scholarship; Thomas Woodcock Prize; Gold Medal in Clinical Medicine and Surgery; John Hall Gold Medal in Pathology; Holroyd Gold Medal in Anæsthetics; the Walter S. Kay Gold Medal in Mental Diseases; bronze medals. Particulars of all the above may be obtained from the Registrar.

The Medical School.—The Medical Department occupies the entire north wing of the University quadrangle. The various athletic and other students' societies are under the management of the Union Representative Council, elected annually. There are large and comfortable common rooms both for men and women students, and two Students' Unions, one for men and one for women. A refectory is open daily at the University where students may obtain meals and refreshments at moderate prices. The University journal *The Arrows*, edited by a committee of staff and students, is published each term, and the medical school also publishes a journal. A well-equipped Union building is in course of erection. There is good hostel accommodation for women students and similar amenities will soon be provided for men.

Clinical Studies.—The University is within easy reach of the various hospitals with which it is connected for clinical purposes, and, as will be seen, the aggregate number of beds is very large. The SHEFFIELD ROYAL INFIRMARY (500 beds) provides all the opportunities of a large general hospital with special departments for Skin and Ear. The SHEFFIELD ROYAL HOSPITAL (340 beds) has special out-patient departments for Diseases of the Throat, Ear, Skin, Orthopædics, and Mental Diseases. The two institutions are amalgamated for the purposes of clinical practice, medical, surgical, and special. There are special departments for the treatment of Diseases of the Eye, with wards assigned to them, at both hospitals, and excellent junior appointments. The JESSOP HOSPITAL FOR DISEASES OF WOMEN, with 143 beds, has also a Maternity department, with about 110 in-patients per annum and about 3000 out-patient cases attended. The CHILDREN'S HOSPITAL has 92 beds. Special courses on Fevers are held at the CITY FEVER HOSPITALS (988 beds) and on Mental Diseases at the SOUTH YORKSHIRE MENTAL HOSPITAL (2000 beds). Every facility is afforded in the various laboratories for the prosecution of advanced studies and research.

Post-graduate Courses.—Post-graduate courses of clinical instruction are held annually in the various hospitals connected with the School.

UNIVERSITY OF BRISTOL

In the Faculty of Medicine there are the following degrees: Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), Bachelor of Dental Surgery (B.D.S.), and Master of Dental Surgery (M.D.S). There are also the following diplomas: Diploma in Public Health (D.P.H.), Diploma in Dental Surgery (L.D.S.), and Diploma in Veterinary State Medicine.

All candidates for degrees in Medicine, Surgery, and Dentistry are required to pass, at Matriculation standard, an examination called the School Certificate Examination, or to pass such examination as may be regarded as equivalent by the Senate. All courses, degrees, and diplomas are open to men and women.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates shall be not less than 21 years of age and shall have pursued the courses prescribed by University Regulations during not less than five years after passing the first examination in Chemistry and Physics and entering on the professional curriculum at the University, or an institution recognised as equivalent, of which three shall have been passed in the University, and two of these three subsequent to passing the second examination. All candidates for the degrees of M.B., Ch.B. are required to satisfy the examiners in the several subjects of three examinations. The First Examination: The subjects of examination are: Chemistry (Inorganic), Physics, and Biology, the courses pursued being those for the time being approved for the intermediate part of the B.Sc. curriculum. This part of the curriculum shall extend over one year. (Candidates who have passed the Higher School Certificate approved by the Board of Education in these subjects will not be required to sit for the first examination and will be regarded as having completed one year of study.) The Second Examination: The subjects of examination are: Organic Chemistry (Part I.) and Anatomy and Physiology (Part II.). The Final Examination: The subjects of examination are: Materia Medica and Pharmacy, Pharmacology and Therapeutics, General Pathology, Morbid Anatomy, and Bacteriology (Part I.); Special Pathology, Forensic Medicine and Toxicology, Public Health, Obstetrics (including Diseases of Women), Surgery (Systematic, Clinical, Practical, and Operative, including Ophthalmology and Oto-rhino-laryngology), Medicine (Systematic, Clinical, and Practical, including Mental Diseases) (Part II.). The subjects included in Part II. may be taken in two groups—viz., Group I., Surgery and Obstetrics; Group II., Medicine, Public Health, Special Pathology, Forensic Medicine, and Toxicology. Candidates may pass Parts I. and II. together, or separately, and the two groups of Part II. may be taken together or separately, but no student can obtain honours who elects to take the two groups of Part II. separately. Forensic Medicine and Toxicology may be taken with Part I., or with Group II. of Part II.

Degree of Doctor of Medicine.—Candidates shall be Bachelors of the University of not less than two years' standing as such and may elect either (1) to pass an examination in General Medicine, or (2) to pass an examination in State Medicine, or (3) to present a Dissertation. The candidate who elects to pass the examination in State Medicine must hold a Diploma in Public Health of some University or College, and the candidate who elects to present a Dissertation may be examined in the subject thereof.

Degree of Master of Surgery.—The degree may be taken in General Surgery or in Special Subjects. Candidates shall be Bachelors of the University who have practised for two years in an approved hospital (including the holding of an approved appointment for six months) and one of the two years shall have been spent in a hospital with a medical school attached. They shall present a Dissertation and pass an examination. For General Surgery, the examination shall include a written examination in Surgery, a written examination in Surgical Anatomy and Surgical Pathology, a Clinical examination, an oral examination and an examination in Operative Surgery. For special subjects—that is, Ophthalmology or Oto-rhino-laryngology or Gynæcology—the examination shall include a written examination in the Anatomy, Physiology, and Pathology of the region of the body concerned (including in the case of Ophthalmology, Physiological Optics) and a written examination in General Surgery together with a written, oral, and clinical examination in the particular branch of Surgery concerned, as well as an examination in Operative Surgery of the region concerned.

Scholarships and Prizes.—The following are awarded: The Ashworth Hallett Scholarship, value £40, open to women only; two Martyn Memorial Pathological Scholarships of £10 each; the Tibbits Memorial Prize, value 7 guineas, for proficiency in practical surgery; the Committee's Gold and Silver Medals for fifth or sixth year students for general proficiency; the Augustin Prichard Prize, value about 6 guineas, for proficiency in anatomy; the Henry Clark Prize, value 11 guineas, for proficiency in gynæcology; the Crosby Leonard Prize, value 6 guineas, for proficiency in surgery; the Suple Surgical Prize, a gold medal and 7 guineas; the Suple Medical Prize, a gold medal and 7 guineas; the Henry Marshall Prize, value £12, for dressers; the H. M. Clarke Scholarship, value £15, for proficiency in surgery; the Sanders Scholarship, value £22 10*s.*, for general proficiency; the Barrett-Roué Scholarship for proficiency in diseases of the eye, ear, nose, and throat or skin, value £17; Lady Haberfield Scholarship, value about 25 guineas; the Paul Bush Gold Medal in alternate years to best Resident Medical Officer at Royal Infirmary; Markham Skerritt Memorial Prize, awarded every three years to that member of University, not a member of Medical Board, who, in opinion of that Board, has published the best original work during the three years.

Bristol City Senior Scholarships and those offered by the Counties of Gloucestershire, Somerset, Wilts, and Dorset and the City of Bath are tenable in the University. There are also a Miriam Badock Scholarship of the value of £120, H. H. Wills Science Scholarships, open to boys proceeding from Clifton College; and the Harold Greenwood Memorial Scholarship, of the value of £20, open to boys who have received instruction at State-provided schools in Clevedon (or elsewhere in Somerset) and subsequently at secondary schools in Somerset or Bristol. The Beaverbrook Fellowship and some of the Fellowships awarded by the Colston Research Society for research in the University are allotted to the Faculty of Medicine. University Graduate Scholarships are open to graduates of not more than one year's standing. The Michael Hiatt Baker Scholarship of the value of £200 is open to graduates from New Zealand for research in the University.

Clinical Studies.—The Allied hospitals (BRISTOL ROYAL INFIRMARY and BRISTOL GENERAL HOSPITAL) have between them more than 700 beds and extensive out-patient departments, special clinics for Diseases of Women and Children, including antenatal and postnatal work, also for eye, ear, nose and throat, and skin diseases, in addition to large and well-equipped departments for Dental work and large outdoor Maternity Departments. The Bristol Royal Infirmary has now been selected by the National Radium Commission as a Radium Centre.

At each of these institutions there are well-arranged pathological museums, post-mortem rooms, and laboratories for morbid anatomy. There are also laboratories for work in clinical pathology, bacteriology, and biochemistry, in which special instruction is given in these subjects. Departments are provided and well-equipped for radiology, radiotherapy, actinotherapy, electrotherapy, and massage, with all forms of physiotherapy.

The students of the school also attend the practice of the Royal Hospital for Sick Children and Women, containing 120 beds, and that of the Bristol Eye Hospital with 40 beds, the Bristol Mental Hospital, Southmead Hospital, and Ham Green Fever Hospital. Other institutions, including Stoke Park Colony for mental defectives and the Winford Orthopædic Hospital, are also available for their special purposes.

There are numerous salaried junior appointments for residents who are graduates.

Post-graduate Study.—Qualified medical practitioners may be appointed as clinical assistants for a period of one or more months. They may act as assistants, if times permit, in more than one department and in any of the hospitals during their period of study. They will be entitled to the use of the clinical laboratories and medical library, and have the right to attend in all departments, including operations, post-graduate and ordinary clinical demonstrations, and post-mortem examinations. Demonstration courses are held at various times when applied for by groups of practitioners.

All inquiries and applications for admission should be addressed to the Director of Post-graduate Studies (Clinical Section), Department of Medicine, University of Bristol, who can be seen on any day by appointment.

Further information as to scholarships, curricula, and fees can be obtained from the Dean of the Faculty of Medicine or the Registrar of the University.

UNIVERSITY OF WALES

THE WELSH NATIONAL SCHOOL OF MEDICINE

The University grants degrees in Medicine and Surgery—Bachelor in Medicine and Bachelor in Surgery (M.B., B.Ch.), Doctor in Medicine (M.D.), and Master in Surgery (M.Ch.)—and Diplomas in Public Health and Tuberculous Diseases.

Degrees of Bachelor in Medicine and Bachelor in Surgery.—Candidates are required to pursue a course of study of not less than six academic years subsequent to their matriculation in the University, and of these years at least three must have been passed in one of the constituent colleges situated at Aberystwyth, Bangor University College of South Wales and Monmouthshire, Cardiff and Swansea. They must hold an arts or science degree of the University of Wales, or of some other University approved for the purpose, but certain of the courses pursued for a B.Sc. or a B.A. degree may be counted as required for the Medical degrees.

The courses for the M.B., B.Ch. are divided into two sections. The first includes the preliminary subjects: (*a*) Physics, Chemistry, Botany, and Zoology; and (*b*) Organic Chemistry, Human Anatomy, and Physiology. Study of the preliminary subjects and of Organic Chemistry must extend over at least one academic year; study of Physiology and Human

Anatomy must extend over at least two academic years; the first section of the course must occupy not less than three years. The second section includes courses in (*a*) Pathology and Bacteriology, Materia Medica and Pharmacology, (*b*) Hygiene and Forensic Medicine, (*c*) Medicine, Surgery, and Obstetrics and Gynæcology. These courses cannot be commenced until the examinations relating to the preliminary and ancillary courses have been passed. Examinations in all the subjects are held in June of each year, and in Pharmacology, Pathology, Medicine, Surgery, Obstetrics, and Gynæcology, in December also.

Degrees of Doctor in Medicine and Master in Surgery. Bachelors of not less than two years' standing may become candidates for the degrees of Doctor in Medicine (M.D.) and/or Master in Surgery (M.Ch.).

Post-graduate Study.—Certain courses of Post-graduate study are given during the year, and facilities may be offered to graduates in medicine and other duly qualified persons to carry out research work in the different departments of the Medical School.

Clinical Institutions.—Clinical teaching is carried out in the Cardiff Royal Infirmary (490 beds); the Llandough Hospital (City of Cardiff) (340 beds); the City Lodge Hospital (City of Cardiff) (420 beds); the Cardiff City Mental Hospital (790 beds); the Cardiff City Sanatorium (Fevers) (300 beds); the Prince of Wales' Hospital (Orthopædic) (136 beds); the Cefn Mably and Glan Ely Hospitals (Tuberculosis) (298 beds). These Institutions are modern and well equipped, and provide facilities for both In-patient and Out-patient Clinical Instruction. The Cardiff Royal Infirmary is the main teaching hospital. It serves a district having a population of more than half a million, and during the year 1933 6325 patients were admitted to the wards, and 38,010 patients treated in the Out-patient Departments.

Scholarships, Free Studentships, Prizes, and Medals. Entrance Scholarships, County Free Studentships and Scholarships are available for Medical Students in the first three years of their scheme of study. Particulars of these are contained in a special Prospectus, which can be obtained on application. An Isaac Roberts Scholarship in Science, of the value of £50 per annum, tenable for three years, is awarded triennially on the results of the Entrance Scholarship Examination of the Cardiff College. The Samuel Brothers' Scholarship, value £12 to £15, is awarded annually on the results of the work of the first year of the Medical Course at Cardiff College. The Dr. Price Prize, value £50, is awarded annually on the results of the work of the first year of the Medical Course at the Cardiff College. The Dr. Howell Rees Scholarship, value £17 10*s*., is awarded triennially, and is held in the Welsh National School of Medicine; it is awarded on the result of the examinations in Anatomy and Physiology. Numerous other prizes are awarded for proficiency in different subjects.

Research Scholarships.—A Catherine Buckton Scholarship of £60 for one year is offered periodically by the Council of Aberdare Hall (one of the Halls of Residence for Women Students) to a woman who shall undertake to do Post-graduate work. The Mrs. John Nixon Research Scholarship of £150 per annum is available for the promotion of research in Medicine and Medical Pathology. The Lord Merthyr Research Scholarship, value £200 per annum, is available for the promotion of research in Cancer. A Cecil Prosser Research Scholarship, value £250 per annum, is available for the promotion of research in Tuberculosis. The Ewen Maclean Research Scholarship, value £150 per annum, is available for the promotion of research into the factors which constitute and the conditions which vary resistance to disease, especially as regards midwifery.

Regulations regarding the diplomas in Public Health and Tuberculosis are detailed elsewhere.

All inquiries should be addressed to the Secretary, Welsh National School of Medicine, The Parade, Cardiff.

ENGLISH MEDICAL CORPORATIONS GRANTING DIPLOMAS

CONJOINT EXAMINING BOARD

All the schools described under the heading of the Universities to which they are attached are recognised as suitable places of instruction by the corporations granting medical diplomas. On p. 418 will be found the Metropolitan Hospitals, where general and special studies can be pursued. On p. 424 is a list of the centres outside London affording educational facilities. The courses of study at the principal colonial medical schools are also recognised as qualifying for the examinations of these corporations.

Students of the Royal Colleges pass a Preliminary Examination in General Education recognised by the Board, and a *Pre-Medical Examination* in Chemistry, Physics, and Elementary Biology conducted by the Conjoint Examining Board before commencing the five years curriculum of professional study or some other examination recognised by the Board—namely, the examination in Chemistry, Physics, and Biology for the degree in Medicine of any University recognised by the Board; the Higher School Certificates of Oxford and Cambridge Universities, and the Oxford and Cambridge Schools Examination Board; the Higher Certificates of London, Bristol, Durham Universities, the Joint Matriculation Board of the Northern Universities, and the Central Welsh Board Higher Certificate. A candidate must enter for Chemistry and Physics together, and he will not be allowed to pass in one without obtaining at the same time at least half the number of marks required to pass in the other subject. No study of anatomy and physiology is recognised before this examination is passed. Not more than two terms of professional study (Anatomy and Physiology) will be recognised before Elementary Biology is passed. He will be admitted to the examination on producing evidence of having passed the required preliminary Examination in General Education. The examination is partly written, partly oral, and partly practical. A candidate rejected in one or both subjects of the examination will not be admitted to re-examination until after the lapse of a period of not less than three months.

There are two Professional examinations called the *First* and *Final Examinations*. The courses of study for these examinations may be commenced before the Pre-Medical examination in Biology or some equivalent examination has been passed, provided that three terms of study are completed after the examination has been passed.

The subjects of the First Professional Examination are: Section I. (*a*) Anatomy, including Histology and Embryology; (*b*) Physiology, including Biochemistry. Section II. Pharmacology and Materia Medica. A candidate must have attended at a recognised Medical School courses of instruction in Anatomy, including Embryology, during five terms, during which he must have dissected the whole body, courses of instruction in Physiology, including Biochemistry during five terms, courses of instruction in Pharmacology and Materia Medica. A candidate may present himself for the two Sections together or separately, but he must take parts (*a*) and (*b*) of Section I. together until he has passed in one or both parts, but a candidate will not be allowed to pass in one part unless he obtains at the same time at least half the number of marks required to pass in the other part.

Section II. of the examination may be passed at any time before the candidate enters for the Final Professional Examination, provided that the courses for Section I. have been completed. A candidate who produces satisfactory evidence of having passed an examination in the subjects of Section I. or of either part of Section I. and of Section II. in the examination for the degree in Medicine conducted at a University recognised by the Board will be exempted from further examination in such subjects.

Final Professional Examination.—The subjects of the Final Professional Examination are: Section I. Pathology (including Morbid Anatomy, Morbid Histology, and Clinical Pathology) and Bacteriology. Section II. Part I. Medicine, including Medical Anatomy, Forensic Medicine, and Public Health. Part II. Surgery, including Surgical Anatomy and the use of Surgical Appliances. Part III. Midwifery and Gynæcology. The examination is partly written, partly practical, partly clinical, and partly oral. A candidate may take Sections I. and II. and the three parts of Section II. of the Final Examination separately or may take the whole examination together. He will be required to produce the certificates required by the regulations before being admitted to the respective parts of the examination. Members of recognised universities outside the British Possessions are admissible to the examinations of the diplomas of L.R.C.P. and M.R.C.S. under special conditions. Graduates in medicine and surgery are required to pass the first examination and to complete 24 months hospital practice before admission to any part of the final examination. Undergraduates are required to complete the full curriculum of 33 months for the final examination after having passed the first examination. For further information see the current regulations of the Conjoint Examination Board in England.

Members of certain recognised Indian, Colonial, and Foreign universities who have passed examinations for the Degree of Doctor or Bachelor of Medicine or Surgery in the subjects of the First Examination may present themselves for the Final Examination under special conditions. The Board also grants Diplomas in Public Health, in Psychological Medicine, in Ophthalmic Medicine and Surgery, in Tropical Medicine and Hygiene, in Laryngology and Otology, in Gynæcology and Obstetrics, and in Medical Radiology. Candidates must hold a Medical qualification registrable in the United Kingdom or be Graduates in Medicine of a recognised Indian, Colonial, or Foreign University.

Particulars may be obtained from the Secretary of the Examining Board, Examination Hall, Queen-square, London, W.C.1.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

THE MEMBERSHIP AND FELLOWSHIP

The College confers two separate diplomas—the *Fellowship*, a purely honorary distinction, and the *Membership*, obtained by examination.

Membership.—The age for admission to this diploma, it will be noticed, has been changed from 25 to 23 years. The alteration in the by-law of the College is designed to enable men who have just finished house appointments to sit for an examination for which their recent clinical experience has exactly fitted them. The candidate must either have obtained the licence of the College, or a degree of Doctor or Bachelor of Medicine at a University which is registrable by the General Medical Council and is recognised by the Censors Board. The examination is directed partly to pathology and partly to the practice of medicine. Credit is also given to candidates who show a knowledge of Latin, Greek, French, or German. Further information may be obtained from the Registrar at the College.

Fellowship.—Fellows are selected annually from the ranks of Members by the Council of the College.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

THE FELLOWSHIP

The Royal College of Surgeons of England confers its diploma of Fellow upon a few distinguished persons in an honorary capacity. Two Members of long standing may also be elected to the Fellowship annually. But the bulk of the Fellows obtain the diploma as the result of examination.

Fellowship.—The examination for the Fellowship is divided into two parts—viz., the First Examination and the Second Examination. The subjects of the First Examination are Anatomy and Physiology and those of the Second Examination are Surgery, including Surgical Anatomy and Pathology. The examinations are partly written and partly viva voce, and include the examination of patients and the performance of operations on the dead body. The First Examination is held in June and December and the Second Examination in May and November.

A Member of the College is admissible to the First Examination at any time after receiving his Diploma of Membership. A candidate who is not a Member is admissible after passing the First Professional Examinations of the English Conjoint Board in Anatomy and Physiology, or the equivalent examination in his University, on the production of certificates of attendance upon prescribed courses.

A Member of the College is admissible to the Second Examination at any time after having passed the First Examination on producing evidence of having been engaged not less than six years in the study (or study and practice) of the profession.

A candidate who is not a Member of the College must possess the registrable surgical and medical degrees of universities recognised by the Council and must have been engaged in the study (or study and practice) of the profession for not less than four years subsequent to the date of obtaining the recognised qualification, one year of which shall have been spent in attendance on the Surgical Practice of a recognised hospital. The diploma of Fellow is not conferred upon successful candidates until they have attained the age of 25 years.

From Jan. 1st, 1935, conditions of admission to the Second Examination will be as follows: A candidate who has passed the First Examination and who is *either* (*a*) a Member of the College who can produce satisfactory evidence of having been engaged in the study (or study and practice) of the profession for not less than six years, or (*b*) a Graduate of four years' standing in Medicine and Surgery in a University recognised by the Council for the purpose, is admissible to the Second or Final Examination on producing evidence that he has held for not less than six months the post of Resident House Surgeon, or other responsible post in charge of general surgical patients in the wards of a general hospital recognised by the Council for the purpose.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS [1]

The College was founded and incorporated in September, 1929. The objects of the College are set forth in the Memorandum of Association. The first, and most important object, is "To encourage the study and practice of Obstetrics and Gynæcology, subjects which should be inseparably interwoven."

The College consists of Fellows and Members. Candidates for the Membership of the College whose names must be entered on the British Register of Medical Practitioners or on the Register of Medical Practitioners of a British Dominion or Dependency, or of the Irish Free State, or on such other Register recognised by the General Medical Council, have to show evidence of having held resident appointments in general medicine or surgery, as well as in Obstetrics and Gynæcology, before entering for the examination. The Fellowship of the College is granted to those Members who are judged by the College to have advanced the science and art of Obstetrics and Gynæcology. The Fellowship and Membership of the College include practically every teacher of Obstetrics and Gynæcology in Great Britain, and many distinguished exponents in the British Dominions.

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[1] The British College is placed with the English Corporations, but its advantages are open, as are those of the English Colleges to all who can comply with the regulations.

The Fellowship or Membership of the College is now a necessary qualification for election to the staff of several obstetric and gynæcological hospitals, and it is hoped that in time it will be essential for election to the staff of all such hospitals. Consequently, all intending to specialise in these subjects should endeavour to obtain the Membership as soon as possible.

The College also grants a Diploma, which is intended for practitioners who have had special experience in obstetrical work and wish to produce evidence of efficiency in this subject when applying for Consultant or other posts in regard to Maternity services under voluntary, County, or Municipal control.

The Regulations for the Membership and Diploma may be obtained from the Honorary Secretary, British College of Obstetricians and Gynæcologists, 58, Queen Anne-street, London, W.1.

SOCIETY OF APOTHECARIES OF LONDON

The Pre-Medical and Primary Examinations are held quarterly. The Pre-Medical includes Chemistry, Physics, and Elementary Biology. The Primary includes Anatomy, Physiology and Histology, Materia Medica, and Pharmacy. The latter examination cannot be passed before the completion of five terms' Physiology and Practical Anatomy with Demonstrations, and the first two subjects cannot be taken separately except in the event of the candidate having previously passed in one, and obtained at least half the marks required to pass in the other.

The Final Examination for the Licence (L.M.S.S.A. Lond.) is held monthly, except in September. (*a*) Principles and Practice of Surgery, including Surgical Pathology, Surgical Anatomy, Operative Manipulation, Instruments and Appliances. (*b*) Principles and Practice of Medicine, including Therapeutics, Pharmacology, Medical and General Pathology, Bacteriology, and Morbid Histology. (*c*) Midwifery, Gynæcology, Diseases of New-born Children, and the Use of Obstetric Instruments. (*d*) Forensic Medicine, Hygiene, Mental Diseases, and the Theory and Practice of Vaccination. The examination is partly written, partly practical, partly clinical, and partly oral. Sections *a*, *b*, *c*, and *d* may be taken at separate examinations, but there is no exemption from any part of the Final Examination.

The minimum period of medical study extends over five years (57 months), and three academic years (33 months) must elapse after a candidate has passed the examination in Anatomy and Physiology before he can complete the *Final Examination*. The course of study for the Final Examination includes attendance on the Surgical and Medical Practice with Post-mortem Examinations, at a hospital connected with a medical school for a period of three winter and three summer sessions, including a course of Practical Midwifery, with attendance on 20 Midwifery cases. The offices of dresser and clinical clerk must have been filled at a hospital or institution recognised by the Society.

All candidates making their first entry for the Final Examination after Jan. 1st, 1935, will be required to pass the present Section D (Forensic Medicine, Hygiene, and Mental Diseases) with Section B (Medicine, General Pathology, and Bacteriology). The Sections which may be taken separately will therefore be; A, Surgery; B + D, Medicine, etc.; C, Midwifery. The form and scope of the Examination will otherwise be unchanged.

The certificates prescribed by the Regulations must be produced before admission to the respective sections of the Final Examination.

Master of Midwifery.—The examinations for this Diploma are held in May and November. Candidates will be admitted to the examination who have been registered practitioners for at least three years and who have held a resident appointment in an institution recognised by the Society for six months or more, and who for three months in each case have attended an antenatal clinic and an infant welfare centre, also recognised by the Society. Medical officers employed by a public health authority, and having special duties connected with Maternity and Child Welfare, will be admitted to the Examination on production of evidence to that effect. The examination will be conducted by written papers and by clinical and oral tests.

Candidates for the examination must send in their certificates to the Registrar, who will supply any other information.

METROPOLITAN CENTRES AFFORDING EDUCATIONAL FACILITIES

Certain organisations and institutions provide for the needs of the medical student in his curriculum and for the post-graduate student requiring special forms of instruction and opportunities for clinical observation. Many of the institutions are recognised by the English Conjoint Examining Board as a place of study for the fifth year of the curriculum.

Special Diplomas in public health, tropical, psychological, and ophthalmic medicine, medical radiology and electrology, laryngology, otology, and tuberculosis are now granted in proof of intensive work along the different lines indicated. Of these, the Diploma in Public Health, being regulated by the General Medical Council, is registrable. Appointments to and promotion in the various Services are largely dependent on the possession of a particular diploma, and each syllabus of the special courses available at the institutions which follow, either with or without association with the Fellowship of Medicine, is planned to afford the necessary instruction.

The Special Diplomas are dealt with fully on p. 454, where the Bethlem Royal Hospital, the Maudsley Hospital, and the Diploma in Psychological Medicine are referred to. Similarly the Hospitals of the Metropolitan Asylums Board provide post-graduate as well as under-graduate facilities, while the hospitals of the Seamen's Hospital Society both supply the instruction necessary for the Diploma in Tropical Medicine and Hygiene, and coöperate in the activities of the Fellowship of Medicine and Post-Graduate Medical Association.

The Fellowship of Medicine and Post-Graduate Medical Association

Some 50 general and special London hospitals work in conjunction with this Association, which has its office at Room 28 in the House of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1. Arrangements are made for courses in medicine and in surgery and the specialties, occupying the whole or part of each day for periods of one to four weeks. Daily clinical teaching arranged. Special evening clinical courses for the M.R.C.P. and F.R.C.S. (Final) Examinations are organised at intervals. Courses, demonstrations, and lectures arranged by the Fellowship of Medicine are open only to members of the Fellowship. The membership fee is £1 1*s*. per annum, which includes the subscription to the monthly *Post-Graduate Medical Journal*. The provisional list of Special Courses impending will shortly be available. Full information regarding the courses of study and fees can be obtained from the Secretary.

Infectious Hospitals of the London County Council

Classes of instruction in fevers for under-graduate medical students are given at the various hospitals. In addition, classes of instruction for the Diploma in Public Health, which comply with the rules of the General Medical Council for that diploma, are given at two of these hospitals—viz., the North-Western Hospital and the Brook Hospital. Full particulars relating to the classes at the hospitals may be obtained on application to the Medical Officer of Health, London County Council, Public Health Department (Special Hospitals), County Hall, Westminster Bridge, S.E.1.

Seamen's Hospital Society

The Society possesses six establishments: the Dreadnought Hospital at Greenwich, 250 beds; the Albert Dock Hospital, E.16, 53 beds; the Hospital for Tropical Diseases, Endsleigh-gardens, W.C.1, 76 beds; Tilbury Hospital, Tilbury Docks, Essex, 94 beds; King George's Sanatorium for Sailors, Bramshott, Hants, 80 beds; and the Angas Home, Cudham, 36 beds. Courses of operative surgery and surgical pathology are arranged by the London School of Clinical Medicine at the Dreadnought Hospital. Post-graduate Courses for Ship Surgeons are organised by the Society, Part II. (Tropical Medicine and Hygiene) being held at the London School of Hygiene and Tropical Medicine, commencing April 11th, and Part III. (Refresher Course in clinical subjects) at the Dreadnought Hospital, Greenwich, commencing in October.

The clinical teaching of the London School of Hygiene and Tropical Medicine is given at the Society's Hospital for Tropical Diseases, Endsleigh-gardens, W.C.1.

GENERAL

Royal Northern Group of Hospitals

The Royal Northern Hospital, Holloway, London, N.7, is the main institution of the Royal Northern Group of Hospitals, which includes the St. David's Wing for private patients, the Royal Chest Hospital, City-road, E.C., Grovelands Hospital (Recovery Branch), Southgate, the Maternity Nursing Association, and the Reckitt Convalescent Home, Clacton-on-Sea. The total number of beds in the group is 466. Besides the honorary staff, there are six anæsthetists, two pathologists, medical and surgical registrars, resident medical officer, two resident house physicians, three resident house surgeons, two resident casualty officers, one resident obstetric surgeon, and one resident anæsthetist. The large rectangular and circular wards, each of which contains 25 beds, the maternity ward and children's ward for children up to 5 years of age, the observation wards in the new Casualty Department, the six operation theatres, and out-patient department are designed with a view to offer the greatest facilities for clinical work. The Special Departments include the following: Orthopædic, genito-urinary, and neurological, physiotherapeutic, pathological, tuberculosis, venereal diseases, and X ray (recently remodelled). Patients are removed to the Recovery Branch by ambulance a few days after operation. Demonstrations are given daily in the wards and out-patient departments. Clinical assistants (qualified), clinical clerks, and pathological clerks are appointed in the general and special departments, and may receive certificates at the end of their terms of office. A new maternity department has been opened and the light department has been re-equipped. A complete hospital for paying patients has just been completed.

Post-graduate lectures and demonstrations are arranged from time to time, as advertised in the medical press.

Prince of Wales's General Hospital

This hospital, situated in Tottenham, is in the midst of a densely populated neighbourhood, and contains medical, surgical, gynæcological, and children's wards, having 238 beds. There are special departments for gynæcological cases, diseases of the eye, ear, throat, and nose, skin diseases, medical electricity, radiography, and dentistry. Operations are performed every afternoon of the week (except Saturday) at 2.30 P.M. Clinical instruction is given in the wards and out-patient departments, laboratories, and lecture hall in connexion with the North-East London Post-Graduate College attached. There are six resident medical officers, and clinical assistants are appointed under certain conditions. Special intensive post-graduate courses are also held at intervals throughout the year.

West London Hospital

This hospital has 220 beds. Attached to the hospital is the West London Post-Graduate College. The practice of the hospital is reserved exclusively for qualified men. Instruction is given in the medical and surgical out-patient rooms and demonstrations are given in the wards. Clinical assistantships are obtainable in the various general and special out-patient departments. The accommodation for post-graduates consists of a lecture room, together with reading, writing, and class rooms. The hospital has a fully equipped pathological laboratory. The certificate of the hospital is accepted by the Admiralty, War Office, Colonial Office, and India Office in cases of study leave, and by the Conjoint Board of Examiners.

National Temperance Hospital

The hospital (Hampstead-road, N.W.) contains 152 beds. The medical and surgical practice of the hospital is open to students and practitioners. Operations: Monday, 1.30 P.M.; Tuesday, 2.30 P.M.; Wednesday, 2 P.M.; Thursday, 8 A.M.; Friday, 11 A.M. Out-patient Departments for special diseases have been opened: Diseases of the Stomach and Disorders of Digestion, Dermatology, Ophthalmology, Oto-rhino-laryngology, and Chest.

Hampstead General and North-West London Hospital

In-patient Department: Haverstock Hill, N.W.; Out-patient Department: Bayham-street, Camden Town (138 beds—viz., 109 free, 8 isolation and observation, and 21 paying or contributory). Serves Hampstead and the populous districts of Kentish Town and Camden Town. The out-patient and casualty departments are at Bayham-street, Camden Town. Hampstead casualties are received at Haverstock Hill. In addition, consultative clinics are held at Haverstock Hill, where patients are seen upon presenting letter from their doctors. There is a post-graduate School free to the medical practitioners of the district. The hospital is also associated with the Fellowship of Medicine.

Metropolitan Hospital

This hospital has 150 beds, 17 of which are reserved for children. The adult accommodation includes special wards for the reception of Hebrew patients, and there is a Kosher kitchen and Jewish cook. Operations are held in the afternoons daily, except Saturdays and Sundays. The out-patient department is a large one, and has facilities for the treatment of all diseases; Jewish patients can attend special sessions. Special departments comprising: Neurological, Ophthalmic, Rectal Diseases, Diseases of Women, Genito-urinary, Diseases of the Throat and Ear, Eye and Skin, Electrotherapeutics, Dental, and V.D. Attached to the hospital is a Tuberculosis Dispensary for patients from the boroughs of Hackney and Stoke Newington.

Queen Mary's Hospital for the East End

This hospital has developed from the West Ham and Eastern General Hospital. It has 219 beds and ministers to a very poor public. Founded as a dispensary in 1861, and developing into a hospital in 1890, steady extensions have been made during this century. A Royal Charter was obtained in 1917, and the hospital has become a valuable charity with a full medical staff of physicians and surgeons, and specialists for gynæcology, obstetrics, ophthalmological surgery, radiology, dermatology, and dental surgery. The Fellowship of Medicine makes frequent use of the opportunities.

NEUROLOGY

National Hospital, Queen-square

The hospital, with the Convalescent Home at East Finchley and branch at Clapham Park, contains 265 beds and cots. The out-patient physicians attend every Monday, Tuesday, Wednesday, Thursday, and Friday at 2 P.M., and the physicians daily. Clinical clerks are appointed under physicians and clinical assistants to out-patient physicians. Post-graduate Courses of Lectures and Demonstrations are held twice every year, usually commencing in January and October, and lasting about ten weeks. Special courses in Neurological Ophthalmology, Neuropathology, and the Anatomy and Physiology of the Nervous System are given. The Pathological Laboratory is available for special work under the Pathologist.

West End Hospital for Nervous Diseases

This institution is recognised by the University of London and by the Conjoint Board as a school of instruction in Neurology for the M.D. degree, Branch III., and for the D.P.M. The Out-patient Department is in Welbeck-street, W.; the In-patient Department is at Gloucester-gate, Regent's Park, and contains 78 beds. Completely equipped with pathological and other special departments, the hospital offers every facility for instruction in Neurological subjects. In conjunction with Bethlem Royal Hospital it offers courses of instruction for the D.P.M. The hospital coöperates with the Fellowship of Medicine in the programmes of special post-graduate teaching organised by the Association. A concentrated week's course for general practitioners will be held this year from Oct. 29th to Nov. 3rd. The practice of the hospital is open to students and practitioners by arrangement. Appointments as Hon. Clinical Assistants in the Out-patient Department are open to registered medical practitioners. Senior and Junior Resident House Physicians are appointed for a period of six months in the first place with remuneration at the rate of £150 and £100 per annum, respectively. The Savill Memorial Prize (value £15) and Medal are offered biennially for competition among post-graduate students who have attended the practice of the hospital or any special course.

Hospital for Epilepsy and Paralysis

This hospital in Maida Vale, W., contains 88 beds, including 20 private wards and 6 pay beds. Both in-patient and out-patient departments are open free to students, as well as to medical graduates. The out-patient department is open every week-day except Saturday at 2 P.M.

HEART AND LUNGS

Royal Chest Hospital

The Royal Chest Hospital, City-road, E.C., associated with the Royal Northern Group of Hospitals, has accommodation for 84 in-patients and a large out-patient department, open daily. Special departments include Thoracic Surgery, Laryngology, Radiology, Electrocardiograph, Massage and Physical Exercises, and an Ultra-violet Light clinic. Clinical Assistants are appointed to work with the physicians in the out-patient department. The Tuberculosis Dispensary for Islington South is attached to the hospital.

Brompton Hospital for Consumption and Diseases of the Chest

The hospital contains 344 beds, of which 30 are allocated to the Surgical side and 98 to Paying Patients. A further 150 beds are provided at the Sanatorium at Frimley, which also contains beds for paying patients. The beds for paying patients at the hospital are so divided up as to provide Wards of two and five beds each at a small inclusive fee, and single bedrooms in which the fees are non-inclusive. A first assistant resident medical officer, whose duties include those of assistant to the surgeons, is appointed annually; a second assistant resident medical officer, who assists in the artificial pneumothorax clinic, is also appointed annually. There are six resident house physicians, whose duties include attendance at the out-patients' and special departments, and one of these serves as assistant to the tuberculosis officer for Chelsea; these officers are appointed for a term of six months each. Post-graduates are admitted to the practice of the hospital. Clinical assistants are appointed to the in-patient and out-patient physicians, the surgeons and the special departments of the hospital. Clinical demonstrations in the Wards, the out-patient and special departments are given throughout the year, and two special post-graduate courses of one week each, and three week-end courses are held annually. Special courses are also held in the Pathological Department. The medical practice of the hospital is recognised by the Conjoint Board, the University of London, the Apothecaries Society, and the Army and Navy and Indian Medical Boards. Four special courses for students of eight demonstrations each are held during the year before each final Conjoint Board Examination.

City of London Hospital for Diseases of the Heart and Lungs

(186 beds). Special Departments: Surgical, Laryngological, Bronchoscopical, Radiological, Pathological, Electrocardiographic. Assistants are appointed to the Clinics, and a limited number of research workers to the Pathological Department. The in-patients staff visit generally in the afternoon; out-patients at 2 P.M. Graduates are admitted on payment of fees which entitle them to attendance at clinics, post-mortem demonstrations, and operations. Special demonstration and lecture courses are provided, and a club room. Graduates desiring Assistantships in any department should address applications to the Head of that department. A Tuberculosis Dispensary (Boroughs of Bethnal Green and part Hackney) is established at the Hospital.

National Hospital for Diseases of the Heart

The practice of the hospital, with 44 beds, is open daily to post-graduates and others. Systematic courses of instruction, with lectures and clinical demonstrations, are arranged during the winter and summer sessions; in addition an intensive course, of a fortnight's duration, takes place in January, June, July, and October of each year. The hospital is fully equipped with all the modern instruments for the investigation of the diseases of the cardiovascular system, and facilities exist for those requiring practical instruction in electrocardiography, X rays, and other graphic methods. Clinical Assistants in the out-patient department are appointed from time to time.

DISEASES OF WOMEN AND CHILDREN

Hospital for Sick Children

The Hospital is situated in Great Ormond-street, W.C., contains 252 beds, and has an Out-patients' Department attended by some 30,000 new cases each year. There are Asthma, Dental, and Rheumatic Clinics. The practice is open to students of both sexes who have completed four years' medical study and also to qualified medical men and women. Members of the Medical Staff are recognised by the University of London as teachers in Diseases of Children. Clinical instruction is given daily by Members of the Honorary Medical Staff. Clinical Clerks are appointed once a month. These appointments are open to students of recognised medical schools. Arrangements have been made with the London School of Medicine for Women for the routine admission of their students for Clerkships in the wards. Time spent in clerking and dressing is recognised by the Universities of London, Oxford, and Cambridge as part of the final curriculum. Facilities are afforded to post-graduates for obtaining theoretical and practical instruction in Clinical Pathology, Bacteriology, and Medical Biochemistry in the Laboratories. In addition, special courses lasting a fortnight and consisting of about 60 lectures, &c., of one hour each, are held twice yearly, usually in May and October.

Queen Charlotte's Maternity Hospital and Midwifery Training School

This hospital, formerly Queen Charlotte's Lying-in Hospital, is situated in Marylebone-road, N.W. The hospital receives over 2700 patients annually, besides having a large out-patient department. Medical students and qualified practitioners are received at all times of the year. They have unusual opportunities of seeing obstetric complications and operative midwifery on account of the very large number of primiparous cases—nearly one-half of the total admissions. Clinical instruction is given on the more important cases which present themselves. They also receive valuable instruction in the Antenatal and Child Welfare Departments, where over 4000 patients attend yearly. Special Lecture-demonstrations are given by members of the staff. Certificates of attendance at this hospital are recognised by all the Universities, Colleges, and licensing bodies. Pupil midwives and maternity nurses are received and specially trained. A Residential College provides accommodation for students and qualified practitioners (both men and women), and is opposite the hospital, with which it is in telephonic communication.

Arrangements have been made for Medical Students to receive the preliminary instruction in Practical Midwifery recommended by the General Medical Council.

The Isolation Block (30 beds) for Puerperal Fever and Puerperal Pyrexia, which has been built on the new site at Ravenscourt Park, Hammersmith, was opened for the reception of patients in September, 1930, and the Research Laboratories, which have been erected adjoining this block, are now in full working order. Students may attend the clinics conducted by the staff at the Isolation Block.

City of London Maternity Hospital and Midwifery Training School

This hospital (City-road, E.C.) receives nearly 1700 in-patients annually, in addition to attending mothers in their homes. Monthly or fortnightly residential courses are provided for two Medical Students at a time and facilities are offered to Post-graduates to see the work of the Antenatal Clinics on three mornings weekly. Pupil Midwives and Maternity Nurses receive the recognised course of training, assisted by a Sister Tutor.

Royal Waterloo Hospital for Children and Women

This hospital has recently undergone considerable extensions and has now 130 beds, while the latest buildings include a Nurses' Home, a new Operating Theatre, and private pay beds. It has a full staff of surgeons, physicians, and gynæcologists, and also special departments. Amongst the many new additions to the equipment of the hospital is an Electrocardiograph apparatus. A new Orthopædic Department is in use, and the Physiotherapeutic and Electrical Department has been extended and re-equipped. There are facilities for post-graduates to attend the general and special clinics in medicine and surgery for in-patients, and for out-patients, including a genito-urinary clinic, a clinic for varicose veins, a L.C.C. Clinic for children suffering from rheumatic fever and chorea, and the X ray department for gastro-intestinal diagnosis. Particulars of post-graduate courses, which are held from time to time, can be obtained from the Secretary of the Hospital.

Victoria Hospital for Children

This hospital in Tite-street, Chelsea, S.W., contains 138 beds and a large out-patient department; the home at Broadstairs has 50 beds. There are two private wards where patients may be under the care of any medical practitioner holding an appointment on the staff of a recognised hospital, and the question of payment for his fees is arranged between him and the child's parents.

Queen's Hospital for Children

This hospital, for the sick children of the poor up to 14 years of age, was formerly known as the North-Eastern Hospital for Children. There are 160 beds in London (Hackney-road, E.2) and 44 at the seaside branch, Little Folks Home, Bexhill. Special departments in Ear, Nose, Throat, Skin, and Eye, and Dentistry. Rheumatic Clinic in coöperation with L.C.C. schools twice weekly. A radiologist attends four times weekly. There are massage and light departments, and a special whooping-cough physician. The practice of the hospital is open to students by arrangement with the medical staff, and post-graduate instruction in children's diseases, lectures and demonstrations are given at times notified by the Fellowship of Medicine.

Paddington Green Children's Hospital

This is a hospital of 51 beds, with a large out-patient department and a full staff, with Eye, Ear, Skin, Light, and Dental departments. The facilities which it offers for observation of clinical practice are used by the Fellowship of Medicine.

Hospital for Women, Soho

This hospital in Soho-square, W., contains 81 beds. The teaching is available for post-graduates only in limited numbers. Operations take place on Tuesdays, Wednesdays, and Thursdays at 2 P.M. and on Wednesdays and Fridays at 9.30 A.M. The X ray department is supplied with the latest installation both for diagnosis and treatment, and experience can also be gained in the treatment of malignant disease by means of radium. Incorporated is the London School of Gynæcology, comprising attendance in out-patient department, operating theatre, clinical lectures, and X ray treatment.

Samaritan Hospital for Women

Contains 70 beds. Qualified practitioners are admitted as clinical (gynæcological) assistants to both the in- and out-patient departments. Full particulars may be obtained from the Secretary to the Medical Committee at the hospital, Marylebone-road, N.W.

Princess Elizabeth of York Hospital for Children

There are 140 beds. Clinical instruction in Pædiatrics is given to fifth-year Students at the hospital in Glamis-road, Shadwell, E. Two clinical clerkships for qualified or unqualified students are open every three months. Clinical assistants are from time to time appointed in the out-patient department. There is an Orthopædic Clinic on Wednesdays and a Rheumatism Clinic on Fridays. Special instruction in Infant Feeding. Post-graduate Clinical Demonstration on the third Wednesday in each month at 3.30 P.M.

Chelsea Hospital for Women

This hospital has 104 beds; 18 for patients paying £5 5*s.* a week and moderate fees to the surgeons for operations. There is a convalescent home of 32 beds at St. Leonards. In the out-patient department the patients are seen at a nominal payment or with subscribers' letters. The hospital caters for post-graduate teaching. In the out-patients' department clinical assistantships can be obtained which entitle the holder to attend and examine patients under the instruction of the visiting surgeons. The operating theatre is open to visitors, and all operations are demonstrated and discussed by the surgeons. The Pathological Department contains one of the finest gynæcological museums in the country. Special intensive courses, with lectures and special demonstrations, are held three times a year through the organisation of the Fellowship of Medicine.

Evelina Hospital and Belgrave Hospital

The Evelina Hospital, Southwark (80 cots), and the Belgrave Hospital (76 cots), Clapham-road, also give facilities for out-patient practice.

CANCER

Cancer Hospital (Free)

The hospital, situated in Fulham-road, S.W., contains 135 beds for poor persons afflicted, who are admitted free. The Out-patient Department is open every week-day, except Saturday, at 2 P.M., also Wednesday morning at 10 and Saturday morning at 11. A course of study in Physics and Radiology, qualifying for the Diploma in Medical Radiology, is given. The hospital is a recognised teaching school of the University of London, in Medical Radiology, Experimental Pathology, and Pathological Chemistry. Senior and Junior Resident House Surgeons are appointed for a period of six months at a salary at the rate of £100 per annum.

Mount Vernon Hospital

The hospital contains 130 beds for surgical cancer cases. Clinical Demonstrations are given by the visiting Surgical Staff at the hospital at Northwood. Clinical assistants are appointed to surgeons in the wards. Diagnostic and follow-up departments, 14, Riding House-street, W. Further information can be obtained from the Secretary, 32, Fitzroy-square, W.

Marie Curie Hospital

This hospital, which is officered by medical women, is a radium centre for the treatment of women suffering from cancer and allied diseases. The In-patient Department contains 39 beds, of which eight are for private patients. There is a daily Out-patient Clinic to which cases are sent for diagnosis and at which the cases already treated by radium are kept under observation. A department for deep X ray therapy was opened in January, 1934. The practice of the hospital is open to graduate visitors, and one graduate wishing to study the subject of radiology is accepted for full-time service for four to six months.

OPHTHALMOLOGY

Royal London Ophthalmic Hospital

The attendance at Moorfields Eye Hospital (Moorfields, 1804–1899), City-road, E.C. (152 beds) is now very large. Operations are performed each day from 10 A.M. to 1 P.M. and four surgeons attend daily. Students are admitted to the practice of the hospital and special courses of instruction are given, which extend over a period of five months, by members of the surgical staff and certain outside lecturers, beginning in October and March. The instructions and classes are arranged to meet the requirements for the various diplomas in Ophthalmology, both for the preliminary examinations in Anatomy, Physiology, and Optics, and those subjects required in the second part. Students of the hospital are eligible as house surgeons or clinical and junior assistants. House surgeons are appointed every six months, clinical and junior assistants every three months. During the past few years certain improvements have been made. A floor of private wards has been opened and the capacity of the hospital increased, and at the moment the out-patients' department is being rebuilt, together with the Medical School, including the Pathological and Bacteriological Departments. When these are finished the arrangements for instruction will be very much improved.

Royal Westminster Ophthalmic Hospital

This hospital, in Broad-street, Holborn, W.C. (86 beds, including 14 rooms for paying patients), has removed from its original site at Charing Cross to much larger premises, well adapted for teaching purposes. The clinics are held in the afternoons from 1.30 P.M. Operations are performed daily in the theatre at 3 P.M. Lectures and practical classes in the various branches of Ophthalmology, including Operative Surgery, Bacteriology, and Pathology, are held during the winter and summer sessions at 5 P.M. The practice of the hospital is open to both men and women practitioners, and medical students. Post-graduate students at the hospital are eligible for appointment as house surgeon, assistant house surgeon, refraction officer (seven appointments paid), and senior and junior assistants.

Royal Eye Hospital

There are 46 beds at this hospital, which is situated in St. George's-circus, Southwark, S.E., and an annual attendance of 68,000 patients. The staff attend daily, Mondays to Fridays at 2 P.M., and on Saturdays at 9.30 A.M., when clinical instruction is given. Special classes held in May and October are planned to meet the requirements of students preparing for the D.O.M.S. and similar examinations, and cover Anatomy, Physiology, Optics, Clinical Ophthalmology, Operative Surgery, and Pathology. Clinical Classes in medical ophthalmology are held for candidates for the M.R.C.P. examinations. A Course suitable for general practitioners is held in April under the auspices of the Fellowship of Medicine. Apart from the Honorary Staff of six Surgeons, there are also a Pathologist, a Bacteriologist, two resident House Surgeons, 12 Chief Clinical Assistants, 24 Clinical Assistants, 14 L.C.C. Refraction Officers, 10 Hospital Refractionists, and an officer in charge of the Squint Training Clinic. Reference departments for general medicine, neurology, dental treatment, ear, nose, and throat investigations, orthoptic training, and radiology, including ultra-violet therapy are available. The pathological and bacteriological departments are available to ophthalmic surgeons and institutions desiring reports on specimens, cases of interest being dealt with without charge. A Research Scholarship in Ophthalmology to the value of 100 guineas per annum is awarded yearly.

Central London Ophthalmic Hospital

This hospital, in Judd-street, St. Pancras, W.C., has 51 beds, and clinical teaching is given daily. The Pathological and Bacteriological Laboratories have been rendered available for the use of any ophthalmic surgeons who desire to send specimens for examination. A small fee is charged for a report. An Orthoptic Department for the treatment of cases of squint has been established, and pupils are taken for training in this work. Voluntary ophthalmic clinics are held on Mondays and Thursdays at 4.30 P.M. Ten private rooms are available for private patients. A clinical Demonstration is held by members of the staff at the Central London Ophthalmic Hospital at 5 P.M. on the first Tuesday of every month. Doctors and students of medicine are admitted free.

GENITO-URINARY AND VENEREAL DISEASES

London Lock Hospital and Home

There are 74 beds for men, women, and children. Male out-patients are seen at 91, Dean-street, Oxford-street, W.1, at any time from 10 A.M. until 10 P.M. daily (Sunday, noon–10 P.M.). Intravenous injections are given at every clinic. Irrigations for males are given daily from 9 A.M. to 11 P.M. Female out-patients and children are seen daily at 283, Harrow-road, Paddington, W.9, from 9 A.M. until 8 P.M. Irrigations for females are given at any time. The hospital is linked up with the Fellowship of Medicine; special courses of lectures are held in May and November each year, and application for tickets should be made direct to the Secretary of the Fellowship. Only a limited number of practitioners and students are permitted to attend the practice of the Female Lock Hospital, and application should be made to the Dean at the Male Lock Hospital between the hours of 11 A.M. and 5 P.M.

St. Mark's Hospital for Cancer, Fistula, and other Diseases of the Rectum

At St. Mark's Hospital for Cancer, Fistula, and other Diseases of the Rectum, City-road, E.C. (founded 1835), for men and women, there are 63 general beds and 9 private beds. Operations are performed on Mondays, Tuesdays, Wednesdays, and Thursdays at 2.30 P.M. and Saturdays at 11 A.M. Medical practitioners and students are invited to the operations and to the clinical instruction in the wards and in the out-patient department. Three weekly courses are held during the year in coöperation with the Fellowship of Medicine.

St. Peter's Hospital for Stone

The hospital in Covent Garden is thoroughly up to date in all departments, and research is still carried out with radium specially loaned for the purpose by the British Empire Cancer Campaign. Medical practitioners and students are invited to attend the practice of the Hospital in the out-patient department, excepting that the only clinic open to medical women is that held at 9.30 A.M. Fridays for women and children. The operating theatre is open to medical visitors as follows: Mondays, Tuesdays, Thursdays 2 P.M., Fridays 2.30 P.M. Special courses of lectures and demonstrations are held in May and November by arrangement with the Fellowship of Medicine.

All Saints' Hospital

The in-patient department of the All Saints' Hospital for Genito-Urinary Diseases is at Austral-street, West-square, St. George's-road, S.E., contains 55 beds, including those in 4 private wards and cubicles, and the terms of admission are free or by payment according to means. The out-patient department provides clinical instruction through the Fellowship of Medicine, in addition to which demonstrations in cystoscopy and other branches of genito-urinary work are available for all medical practitioners at the Out-patient department on Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday afternoons at 2 P.M., without fee.

ORTHOPÆDICS

Royal National Orthopædic Hospital

This institution, situated in Great Portland-street (480 beds), is a good example of the fusion of scattered activities for the creation of an effective whole. The three orthopædic hospitals of the metropolis were combined for the formation of this central institution at the instance of King Edward's Hospital Fund, with the result that the grants from this Fund and the income from subscriptions can now be used to far better purpose and with economy. The hospital has also been approved by the Ministry of Health for the treatment of surgical tuberculosis, the connexion between orthopædics and the therapeutics required in many forms of tuberculosis having become obvious. Country branch at Brockley Hill, Stanmore (280 beds). Both branches of the hospital are residential schools for physically defective children, certified by the Board of Education. A post-graduate course of 14 days is held about March each year. The out-patient department (entrance in Bolsover-street) is open every week-day, except Saturday, at 1.30 P.M. The Evening Clinic on Tuesdays from 6 P.M. to 8 P.M.

EAR, NOSE, AND THROAT

Central London Throat, Nose and Ear Hospital

This hospital in Gray's Inn-road (74 beds) is open daily to all qualified medical practitioners on presentation of their visiting cards. Demonstrations of the cases and clinical instruction are given daily by the chief surgeon of each clinic. Lectures each Friday at 4 P.M. An intensive Course of Lectures (especially suitable to D.L.O. students), with Anatomy and Physiology Class, Operative Surgery Class, Peroral Endoscopy Class, and Pathology Class is given twice yearly—in May and October. Preparatory courses in methods of Examination and Diagnosis at frequent intervals. Consultations on interesting cases take place on the fourth Wednesday in each month at 4 P.M. Clinical Assistants are appointed and are expected to hold office for at least three months. They are required to attend twice weekly at 1.30 o'clock for the afternoon, and at 4.30 o'clock for the evening clinics. New wing, with complete out-patient department and additional wards, was opened in August, 1929, and a Recovery Home at Ealing with 26 beds was opened in July, 1933.

Golden-square Throat, Nose, and Ear Hospital

The hospital (93 beds), which has absorbed the London Throat Hospital, is situated in Golden-square. Clinical instruction in the diagnosis and treatment of disease is given daily in the out-patient department from 2 to 4 P.M., and on Tuesdays and Thursdays from 6.30 to 7.30 P.M. There is an annual out-patient attendance of over 55,000. Minor operations are performed on Mondays, Wednesdays, and Fridays at 9.30 A.M. The hospital now contains 101 beds, of which 15 are for private patients. There is also semi-private accommodation at 4 guineas a week inclusive. Practitioners and medical students are admitted to the practice of the hospital, and clinical assistants are appointed periodically.

Metropolitan Ear, Nose, and Throat Hospital

The hospital is in Fitzroy-square and contains 21 beds. The Out-patient Department is opened daily at 2.30 P.M., Saturdays 1.30 P.M., to all medical practitioners and senior students for acquiring clinical instruction and technical knowledge. Operations upon in-patients are performed on Tuesdays, Wednesdays, Thursdays, and Fridays at 10 A.M. Clinical Assistants are appointed as vacancies occur.

SKIN

London School of Dermatology

The London School of Dermatology, St. John's Hospital for Diseases of the Skin, has an in-patient department (40 beds) at 262, Uxbridge-road, W., and out-patient Clinics are held daily at 2 and 6 P.M. (Saturdays 2 P.M. only), when demonstrations are given on the cases presenting themselves. The Chesterfield Lectures, constituting a systematic course in dermatology, are given on Tuesdays and Thursdays at 5 P.M., from October to March, by the hon. medical staff of St. John's Hospital and the physicians in charge of the Dermatological Departments of the London Teaching Hospitals. The lectures are free to those attending the practice of the hospital and to registered medical students. At the end of the course an examination is held for the Chesterfield Medal in Dermatology, and is open to all medical practitioners. A summer course of lectures is also held during the month of May each year. The electrical department is open daily from 2 to 4 P.M., except on Wednesdays and Saturdays. Laboratory Courses in the Pathology and Bacteriology of the Skin can be arranged.

London Skin Hospital and Hospital for Diseases of the Skin

The London Skin Hospital (Fitzroy-square) and the Hospital for Diseases of the Skin (Blackfriars-road) admit graduates to their practice, which is among out-patients. London Skin Hospital, daily at 2 P.M. and 5.30 P.M.: Hospital for Diseases of the Skin, daily at 2 P.M., and Fridays, 5.30 P.M.

CENTRES OUTSIDE LONDON AFFORDING EDUCATIONAL FACILITIES

Nearly every hospital of a general character in the country having more than 150 beds falls within this category, and certain of them have already been noticed in connexion with the universities to which their clinical practice is attached. The hospitals vary much in size and scope.

The following alphabetical list includes the provincial hospitals which are recognised by the English Conjoint Board for a part of the required training in medical and surgical practice through clerkships and dresserships.

Bath Royal United Hospital

This hospital contains 284 beds of modern construction, 72 of which are for paying patients only; possesses X Ray, Massage, Bacteriological Departments, a Pathological Laboratory, Obstetric and Gynæcological, Ear, Nose, and Throat, and Skin and Neurological Departments. Secretary-Superintendent: Mr. J. Lawrence Mears. V.D. Clinics are held on Tuesdays (for women), and on Fridays and Saturdays (for men), at 5 P.M.

Bedford County Hospital

This hospital at Bedford has 124 beds, including 15 beds in the paying and 13 beds in the maternity wards; Ear, Nose, and Throat Departments, and X Ray and Pathological Departments. There is in connexion with the institution a convalescent home (20 beds) at Aspley Heath, near Woburn Sands. The hospital is approved by the English Conjoint Board for the examinations. Secretary: Mr. B. Wadmore.

Berkshire Royal Hospital

This hospital at Reading, which contains 274 beds includes an Out-patient Department, a Casualty Department, an X Ray and Radiotherapeutic Department, Electrotherapeutic and Massage Department, an Orthopædic Department, a V.D. Clinic, a Laboratory, an Eye Theatre, Eye Wards, a Maternity Ward, a Paying Patients Unit, and a Private Nursing Staff, and two motor ambulances. The hospital is approved as a Training School for Nurses and by the Ministry of Health for V.D. Treatment. The Blagrave Branch, Calcot, contains in addition to the above 63 beds for cases of disease of bones and joints and those requiring open-air treatment.

Bradford Royal Infirmary

This hospital at Bradford contains 223 beds and, in addition, has 50 recovery beds at the Woodlands Convalescent Home, Rawdon. The acting staff consists of 4 Honorary Physicians, 4 Honorary Surgeons, 1 Honorary Radiologist, 1 Honorary Laryngologist, 1 Honorary Ophthalmic Surgeon, 1 Honorary Dental Surgeon, 1 Honorary Assistant Dental Surgeon, 2 Honorary Assistant Physicians, 2 Honorary Assistant Surgeons, 6 Anæsthetists, 1 Pathologist, 1 Physician-in-charge of Radium Therapy Department, 1 Resident Surgical Officer, 1 House Physician, and 4 House Surgeons. There are special clinics for Orthopædic cases, for Electro-therapeutic and Sunlight Treatment, and for Radium Therapy and Laryngological cases. A new hospital of 336 beds is in construction, and a self-contained block for 70 paying patients has been opened adjoining the new Infirmary. Secretary-Superintendent: Mr. J. J. Barron.

Coventry and Warwickshire Hospital

There are 307 beds available at the Main Hospital at Coventry (established 1840), and 40 beds at the Alcock Convalescent Hospital, Keresley (three and a half miles distance), which is used as an annexe. At the Main Hospital there are separate Medical, Surgical, Maternity, Children's, and Accident Wards, also separate Ophthalmic Block complete with its own Theatre. There are separate departments for Clinics for Ear, Nose, and Throat Diseases, X Ray, Electrical, and Sunlight Clinics, also V.D. Clinic. There is also an up-to-date Pathological Laboratory and Cardiograph Department.

Derbyshire Royal Infirmary

This general hospital at Derby (360 beds) was rebuilt in 1892–94. In recent years there have been numerous alterations and additions to keep pace with modern requirements. The hospital is built on the pavilion system and provides, in addition to the usual Medical and Surgical blocks, a separate Ophthalmic block of 40 beds, a separate Children's block of 34 beds (Medical and Surgical), Gynæcological Wards, and an Ear, Throat, and Nose Department. There is a large and well-equipped Out-patient Department, also separate Orthopædic, X Ray, Electrical, Pathological, and Venereal Diseases Departments. The salaried Medical Staff consists of a non-resident Staff of 1 Surgeon-in-charge of X Ray and Electrical Departments, 1 Surgeon-in-charge of Venereal Diseases Department, 5 Anæsthetists, and a Resident Staff of 4 House Surgeons, 1 House Physician, and 1 Assistant House Surgeon and Casualty Officer. Registered Medical Students are admitted to witness the medical and surgical practice on payment of fees. Superintendent and Secretary: Mr. Walter Banks, F.C.I.S.

Devon and Exeter Royal Hospital

The hospital at Exeter contains 230 beds (including special children's wards) and has a good library, museum-post-mortem room, and pathological laboratory. Attendance on the practice of this hospital qualifies for all the examining boards. There is also a Private Nursing Staff attached to the hospital. Sun balconies were added in 1933 to this wing. The "Victory" wing is for the treatment of discharged disabled soldiers and sailors. The Electrical Department now forms one of the most important sections of the hospital. At the department for the treatment of genito-urinary diseases there are three sessions per week, two for men at 3 P.M. and 7 P.M., and one for women at 3 P.M. Doctors in practice may use the museum and library.

Devon (South) and East Cornwall Hospital

This hospital at Plymouth has 240 beds. Special departments include Pathological, X Ray, Deep Therapy, Cardiographic, Ultra-violet Rays, Electro-therapeutic, Orthopædic, Gynæcological, and Aural; also medical and surgical out-patients. Pensioners are received as in-patients, and are also treated as out-patients. The hospital has been approved by the National Radium Commission as a Regional Centre for the South-West.

Gloucestershire Royal Infirmary and Eye Institution

This hospital at Gloucester has 216 beds. Secretary: F. J. Symons. An Electrical and Massage Department has been established and Venereal Clinic opened. Also Ear, Nose, and Throat Department, X Ray, Electrocardiograph, and Ultra-violet Ray Departments, Orthopædic Department, Dental Department, Pathological Laboratory, and Neurological Clinic. Sixteen beds for paying patients in new block.

Hampshire Royal County Hospital, Winchester

This hospital, which was founded in 1736, contains 158 beds. There is a private nursing staff attached. The building and amenities are completely up to date; there are an efficient Out-patient Department, a Pathological Laboratory, and an Electrical and Massage Department. A new Children's Block has been opened.

Hull Royal Infirmary

This hospital contains 267 beds, plus 100 beds at the branch hospital at Sutton-on-Hull, and has undergone steady additions and improvements, including up-to-date Ophthalmic, Radiological, Nose, Throat, and Ear, Dental, V.D., Violet Rays, and Pathological Departments, and a Clinic for Functional Nervous Diseases was opened in 1931, under the Mental Treatment Act, 1930. Recent extensions include a new Operating Theatre, Nurses' Home, and extensions to the old X Ray, Electrical, and Out-patient Departments. The Resident Staff consists of 1 Resident Surgical Officer, 2 House Physicians, 3 House Surgeons, 1 Surgeon to Special Departments, 1 Casualty Officer. Sutton Branch: 1 House Surgeon and 1 House Physician. An annexe at Withernsea has accommodation for 30 patients. The senior house physician's appointment, and that of the house physician at the Branch hospital, are recognised by the University of London for the M.D., Branch I. (General Medicine) examination. It also recognises the posts of senior house surgeon, second house surgeon, and house surgeon of the Branch hospital, for the M.S., Branch I. (General Surgery) examination. The post of house surgeon to the Special Departments is recognised by the Conjoint Board of the Royal Colleges for the examinations for the Diplomas in Ophthalmic Medicine and Surgery, and Laryngology and Otology. The hospital is also recognised by the Royal Colleges for the F.R.C.S. examinations.

Kent and Canterbury General Hospital

The hospital at Canterbury contains 137 beds. Pupils of the staff are admitted to the practice of the hospital. Operations daily. Special departments include Ophthalmic, Ear, Nose and Throat, Venereal, Orthopædic, Electrical, Actinotherapeutic, X Ray, and Bacteriological. Accommodation for paying patients is available. The hospital is recognised by the University of London for the purpose of the M.D. and M.S. examinations.

Leicester Royal Infirmary

At the Leicester Royal Infirmary there are 483 beds (children's 75 and venereal diseases 15); 80 additional beds are retained at local convalescent homes for the reception of pre-convalescent cases. A rebuilding scheme has been carried out and is still being developed, providing modern operating theatres, three new wings, a self-contained out-patients' department, pathological laboratories and post-mortem rooms, and special departments. The Children's Hospital was reconstructed and enlarged, and a Nurses' Home is now in process of enlargement to accommodate 220 nurses at a cost of £55,000. There are 13 resident salaried medical officers—viz., four house surgeons, two casualty officers, three house physicians, three anæsthetists, one dresser. The posts are filled half-yearly—April and October—and afford exceptional opportunities for post-graduate experience. Senior students are appointed as dressers and are given an honorarium (applications to the House Governor and Secretary). A post-graduate course of lectures is arranged annually by the Leicester Medical Society, and clinical classes are held for graduates preparing for M.D. and M.R.C.P.

Norfolk and Norwich Hospital

This hospital at Norwich has at present 392 beds. There is a convalescent home with accommodation for 35 patients at Cromer. The Resident Medical Staff consists of one House Physician, three House Surgeons, one House Surgeon to the Ear, Nose, Throat, and Eye Department, and one Casualty Officer. There is also a Private Patients' Home which has at present 20 beds. Students are admitted to the practice of the hospital for a fee of £5 5s. for six months. House Governor and Secretary: Mr. Frank Inch.

Northampton General Hospital

In 1926 a new isolation block of 30 beds was opened. The number of beds is 253. There is an up-to-date Pathological Laboratory; also X Ray and Therapeutic Department and V.D. Clinic. Two new operating theatres have been built, and a new ophthalmic in-patient department has recently been completed. Further particulars may be obtained from the Secretary-Superintendent. A new Deep X Ray Therapy Department is in course of construction.

Nottingham General Hospital

There are at this hospital 386 beds available for medical and surgical patients, and 110 beds are in the detached branch, known as "The Cedars" Branch of the General Hospital. The honorary staff includes 3 Physicians, 2 Assistant Physicians, 4 Surgeons, 2 Assistant Surgeons, 2 Aural Surgeons, Surgeons in charge of Radium-therapy and Orthopædics, a Physician in charge of the Skin and Ultra-violet Light Departments, a Radiologist, Anæsthetists, and Surgeon-Dentist. The special departments are the Ear, Nose, and Throat, Skin, Dental, Massage, X Ray, Deep X Ray Therapy, Orthopædic, Electrotherapeutic, Ultra-violet Light. The Resident Medical Staff consists of 2 House Physicians, 4 House Surgeons, 1 Aural House Surgeon, and 2 Casualty Officers. The hospital is a recognised training school for nurses.

Portsmouth Royal Hospital

The hospital contains 205 beds. There are Medical, Surgical, X Ray, Massage, Gynæcological, Orthopædic, and Urological Out-patients' Departments. Further particulars may be obtained from the Secretary.

Preston and County of Lancaster Queen Victoria Royal Infirmary

This is a General Hospital with 365 beds, including 72 at two Homes of Recovery. In addition to the Medical and Surgical Wards, there are special wards for Eye, Ear, Nose, and Throat conditions and Venereal Diseases, also a Maternity Department (recognised by the Central Midwives Board). The special departments include Bacteriological, Pathological, Biochemical, X Ray, including Superficial Deep Therapy, Electrocardiograph, Light (including Finsen installation), Neurological, Electrotherapeutical, Ophthalmic, Aural, Orthopædic, Dental, Venereal Diseases (including daily intermediate treatment). Radium treatment is given at the hospital in conjunction with the Manchester Radium Institute. The Visiting Staff consists of 5 Surgeons (4 in consulting practice), 3 Physicians, 3 Radiologists, 2 Eye and Aural, 1 Pathologist, 3 Anæsthetists, 1 Medical Officer to Electrotherapeutic Department, and the Resident Staff—R.S.O., 3 House Surgeons, 1 Casualty Officer, 1 House Physician.

Royal Sussex County Hospital

This hospital at Brighton has 246 beds and affords ample facilities for students, possessing a large out-patient department, including Ophthalmic, Dental, Dermatological, Ear, Nose, and Throat, X Ray, and Electrotherapeutic sections, and a well-appointed clinical research and bacteriological department. The *hospital does not take* resident pupils, but out-pupils may attend the practice of the hospital for any period not exceeding two years, on payment in advance of a fee, not exceeding 20 guineas, as the Board of Management shall direct.

Salisbury General Infirmary

This hospital at Salisbury contains 161 beds. Maternity and Antenatal Ophthalmic Wards; and Ear, Nose, and Throat Wards; maternity and child welfare clinic.

Salop Royal Infirmary

This hospital at Shrewsbury has 156 beds. The New Wing for the reception of Women and Children is capable of accommodating some 40 patients.

South Hants and Southampton Royal Hospital

This hospital at Southampton contains 275 beds with every facility for clinical instruction. There have been many alterations and additions in recent years and further extensions are at present in process. The Staff consists of: 4 Honorary Physicians, 4 Honorary Surgeons, 3 Honorary Anæsthetists, 2 Honorary Radiologists, 2 Honorary Ear, Nose, and Throat Surgeons, 1 Honorary Dermatologist, 3 Honorary Dental Surgeons, 1 Pathologist, 1 Physician in charge of Radium Department, and 6 Resident Officers. Special Departments: Ear, Nose, and Throat, Ophthalmic, Dermatological, Electrocardiograph, X Ray, Massage, and Electricity, Ultra-violet Ray, Radium (Regional Radium Centre), Pathological Institute, and large Out-patient Department.

Staffordshire General Infirmary

This hospital was established at Stafford in 1766, and has over 100 beds. It is a Training School for Nurses. Paying patients are accepted.

Staffordshire (North) Royal Infirmary

The New Infirmary opened in 1869 at Hartshill, Stoke-on-Trent, built on the pavilion plan, has accommodation for 389 patients, including Children's wards, and a Private Patients' Department of 33 beds. The Infirmary is a Regional Radium Centre (National Radium Commission), and has the following departments: Bacteriological, Pathological, Biochemical, Ophthalmic, X Ray, Electrotherapeutical (including Ultra-violet Ray Lamps), Electrocardiograph, Aural, Orthopædic, Dental, Plastic, and Venereal Diseases Clinics, including daily Intermediate Treatments. Recent extensions comprise a new ward block, new X Ray and Orthopædic Departments, with connecting corridors to the existing Infirmary, large extensions to the nurses' home, new boiler house, new chimney stack, new laundry, new surgery and casualty department, and a new pay beds department.

West of England Eye Infirmary

Students of the Exeter hospital can attend the practice of the Eye Infirmary (55 beds). A ward is set aside for newly born babies suffering from infectious eye diseases. Mothers with babies are accommodated.

Wolverhampton—the Royal Hospital

There are 290 beds. Special Departments: Children, Gynæcology, Maternity, Ear, Throat, and Nose Diseases, Electrotherapeutic and X Rays, Orthopædics, Artificial Sunlight, Venereal Disease, Pathological and Biochemical Laboratories, Dentistry, Radium, Skin Diseases, Psychiatric Clinic, and Electrocardiograph. There is an excellent medical library. The Resident Staff consists of Resident Assistant Surgeon, Resident Assistant Pathologist, one House Physician, and five House Surgeons. Women's Department, one Resident Obstetric Officer and one House Surgeon. Pupils are allowed to witness the whole of the practice of the hospital, and to be present at operations, and have every opportunity of acquiring a practical knowledge of their profession. The hospital is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice. A course of Practical Pharmacy is given by the Pharmacist. Fees on application. Applications should be made to the Honorary Secretary of the Medical Committee.

Worcester Royal Infirmary

The hospital has 142 beds. An obstetric department and side wards to be opened this year will increase the accommodation by 16 beds. In 1932 a new wing was added consisting of two operating theatres and a complementary suite of rooms, an Orthopædic and Electro-massage Department, a Pathological Laboratory, and Ear, Nose, and Throat Ward, a Mortuary, Post-mortem Room, Viewing Chapel, and Inquest Room. A new Nurses' Home was also opened in 1932, providing accommodation for Matron, 10 Sisters, and 50 Nurses. The Resident Medical Staff has been increased to three, and a house in the Infirmary grounds has been furnished and equipped for them. All hot water and steam services are run on oil fuel. There is a Department for Venereal Diseases, and Surgical Tuberculosis cases are treated. There is also a Mental Out-patient Clinic.

York County Hospital

This hospital at York contains 197 beds. There are balconies for outdoor treatment, X Ray Department, Orthopædic, Dental, Electrotherapeutic and Massage Departments, actinotherapy installation, and clinical laboratories. There are clinics for Functional Nervous Disorders, Venereal Diseases, and Electrocardiography. The out-patient department is now being rebuilt together with a new Women's Surgical ward.

MEDICAL EXAMINING BODIES AND SCHOOLS IN SCOTLAND

UNIVERSITY OF ABERDEEN

The University of Aberdeen grants four degrees in Medicine and Surgery—viz., *M.D.*, *Ch.M.*, *M.B.*, and *Ch.B.* The Degree of Doctor of Philosophy (*Ph.D.*) is also granted in the Faculty of Medicine.

Degrees of M.B. and Ch.B.—Candidates, before entering on the curriculum, must have passed the Preliminary Examination or hold a qualification recognised as exempting from such examination.

The curriculum for the degrees extends over a period of five years, during which attendance is required in the following subjects: Biology, Physics, Chemistry (Systematic and Practical), Anatomy (Systematic and Practical), Physiology (Systematic and Practical), Materia Medica and Therapeutics, Practical Pharmacy, Pathology (Systematic and Practical), Forensic Medicine, Public Health, Surgery, Medicine, and Midwifery.

Candidates must attend for at least three years the medical and surgical practice of a recognised hospital, they must have attended courses of at least nine months in clinical medicine and clinical surgery, and have acted as clerk in the medical and dresser in the surgical wards of a hospital. Attendance is required on the practice of a dispensary or the out-practice of a hospital and also on courses in Mental Diseases, Fevers, Ophthalmology, Post-mortem Examinations, Venereal Diseases, Tuberculosis, Radiology, X Ray Therapeutics and Electrical Treatment, and Clinical Chemistry, and other special subjects. The candidate is also required to have been properly instructed in Vaccination and to have attended at least 20 Midwifery cases.

Degrees of M.D. and Ch.M.—Candidates for either of these degrees must already hold the degrees of M.B. and Ch.B. of Aberdeen. A Thesis (in duplicate) has to be presented and an examination has to be passed in Clinical Medicine (or in some special Department of Medical Science) or Clinical Surgery, as the case may be.

Degree of Ph.D.—For this degree candidates must pursue a course of special study or research during a period of nine academical terms as Research Students in the University of Aberdeen or in any College or Institution that may be affiliated thereto. A Thesis (in duplicate) must be presented for approval.

A Diploma in Public Health is granted by the University to graduates in Medicine of a University in the United Kingdom, after a special examination.

Scholarships and Prizes.—In the Faculty of Medicine of the University of Aberdeen there are the following Bursaries, Scholarships, and Prizes:—Bursaries:

about 80 Bursaries (competition and presentation) ranging in value from £30 to £50 per annum, most of them being tenable from three to five years. Scholarships: five Post-graduate Scholarships, ranging in value up to £250 per annum. Numerous Prizes and Gold Medals reward proficiency in special departments.

Clinical Studies are carried on mainly at the ABERDEEN ROYAL INFIRMARY. There are 366 beds. The main clinical work of the students is done in the infirmary with its general and special facilities, including a department of clinical chemistry. A dietetic department has recently been established under the direction of a qualified Dietitian. A post-graduate course in medicine is given during the summer term.

The ABERDEEN ROYAL MENTAL HOSPITAL contains about 900 beds, and a class of mental diseases meets at the University of Aberdeen, and clinical instruction is given at the hospital during three months in summer. Wellwood Nursing Home, Pitfodels, Cults, Aberdeenshire, for the treatment of early cases of nervous and mental disorders, has 20 beds.

Students have the opportunity of attending the following institutions: City Fever Hospital, Sick Children's Hospital, General Dispensary, Lying-in and Vaccine Institutions, and the Ophthalmic Institution.

UNIVERSITY OF EDINBURGH

Four Degrees in Medicine and Surgery are conferred by the University of Edinburgh—viz., *M.B.*, *Ch.B.*, *M.D.*, and *Ch.M.* The degree of *Ch.B.* shall not be conferred on any person who does not at the same time obtain the degree of *M.B.*, and the degree of *M.B.* shall not be conferred on any person who does not at the same time obtain the degree of *Ch.B.* No one is admitted to the degrees who has not been engaged in study for five years.

Candidates for the degrees of M.B. and Ch.B. must have attended for at least three academic years the medical and surgical practice either of the Royal Infirmary, Edinburgh, or of a general hospital elsewhere which accommodates not fewer than 80 patients and possesses a distinct staff of physicians and surgeons. They must have attended courses of instruction in Clinical Surgery and Clinical Medicine each of nine months, and courses of instruction in all the subsidiary subjects. They must have attended a course in Clinical and Practical Midwifery and have personally conducted 12 cases at least.

With respect to the places and institutions at which the studies of the candidates may be prosecuted the following regulations have effect: Three of the five years of medical study must be spent in the University of Edinburgh. The remaining two years may be spent in any University of the United Kingdom, or in any Indian, Colonial, or Foreign University or medical school recognised for the purpose by the University Court. Women are admitted to graduation in medicine under the same conditions as men.

Bachelors of Medicine and *Bachelors of Surgery* may proceed to the degrees of *Doctor of Medicine* and *Master of Surgery* after they have spent one year in the medical or surgical wards respectively of a hospital, or the Military or Naval Medical Services, or in scientific work bearing directly on their profession, or two years in practice. In each case an examination must be passed and a thesis submitted.

Clinical instruction is carried on mainly at the EDINBURGH ROYAL INFIRMARY. At this institution there are 1011 beds, including 42 cots for children. The clinical work of the Edinburgh student is done at the Royal Infirmary. Courses of Clinical Medicine and Surgery are given by the physicians and surgeons to male and female students. Special instruction is given on Diseases of Women, Diseases of the Skin, Diseases of the Eye, Ear, Nose, and Throat, and the Teeth. Separate wards are devoted to Venereal Diseases, Diseases of Women, Diseases of the Eye, the Ear, Throat, and Nose, and the Skin, and also to cases of Incidental Delirium or Insanity. There is also a large and complete Radiological Department in which is given theoretical and practical instruction for the University Diploma in Radiology, &c. In addition to the Out-patient Departments connected with the Surgical and Medical Houses, there are separate Out-patient rooms attached to the Special Departments. Post-morten examinations are conducted in the anatomical theatre by the pathologist and his assistants, who also give practical instruction in Pathological Anatomy amd Histology.

The appointments are: 1. Resident physicians and surgeons are appointed and live in the house free of charge. The appointment is for six months, but may be renewed at the end of that period by special recommendation. 2. Non-resident house physicians and surgeons and clinical assistants are appointed for six months. The appointment may be renewed for a like period by special recommendation. 3. Clerks and dressers are appointed by the physicians and surgeons. These appointments are open to all students and junior practitioners holding hospital tickets. 4. Assistants in the Pathological Department.

Among other hospitals where the students obtain clinical instruction are the MUNICIPAL HOSPITALS, the ROYAL HOSPITAL FOR SICK CHILDREN, the EDINBURGH ROYAL HOSPITAL FOR MENTAL DISORDERS, and the CITY HOSPITAL FOR INFECTIOUS DISEASES. The Hospital for Sick Children at Sciennes-road, Edinburgh, has 120 beds, fitted with every modern improvement. A fully equipped out-patient department (medical and surgical) is conducted daily.

Post-graduate Instruction.—In the departments of the Faculty of Medicine provision is made for research by students of graduate standing. In the University laboratories facilities will be provided for approved candidates for the Degree of Ph.D.

In connexion with the University and Royal Colleges Post-graduate Instruction is given each year, chiefly in the Summer Vacation (July–September). Special Courses are arranged for, and particulars may be had on application to the Hon. Secretary, Post-graduate Courses in Medicine.

The University of Edinburgh is especially rich in scholarships and prizes in medical subjects. Full particulars concerning these, as well as concerning the fees at different stages, can be obtained from the Dean of the Medical Faculty.

UNIVERSITY OF GLASGOW

The University of Glasgow is both a teaching and a degree-granting body, but admits to graduation only candidates whose preliminary examination and course of study conform to its own regulations. Within certain limits instruction given by recognised medical schools and teachers may be accepted, but not less than one-half of the subjects other than clinical must be taken in this or some other recognised university, and at least two years of the course must be taken in Glasgow University. Seven degrees, open both to men and women, are conferred: *M.B.* and *Ch.B.* (always conjointly), *M.D.* and *Ch.M.*; *B.Sc.* in Public Health; *D.Sc.* in Public Health; *B.Sc.* in Pharmacy; and *Ph.D.* in the Faculty of Medicine. A Diploma in Public Health (*D.P.H.*) is also granted.

All information as regards the extent and standard of the Preliminary Examination may be obtained by application to the Secretary, Scottish Universities Entrance Board, 81, North-street, St. Andrews.

For the degrees of M.B. and Ch.B. a curriculum of five years is required. The candidate must attend a course or courses of instruction in each of the following subjects of study, extending over not less than the number of terms specified in each case, and including such class examinations as may be prescribed in connexion with the several courses: Chemistry (including Organic Chemistry), with Practical Chemistry, three terms;

Physics (with practical work), one term; Botany (with practical work), one term; Zoology (with practical work), one term; Anatomy and Practical Anatomy, five terms; Physiology and Practical Physiology, three terms; Materia Medica and Therapeutics (together or separately), each subject, one term; Pathology and Practical Pathology, three terms: Medical Jurisprudence and Public Health (together or separately), each subject, one term; Midwifery and Diseases peculiar to Women and to Infants, two terms; Surgery, two terms; Medicine, two terms. Candidates must attend for at least three years the Medical and Surgical Practice of a recognised hospital accommodating at least 80 patients and having a distinct staff of physicians and surgeons. At least nine months' hospital attendance is required on both Clinical Surgery and Clinical Medicine with nine months more of general hospital *practice; the student must have acted for six months* as clerk in medical and dresser in surgical wards, and must have had six months' outdoor practice; he must also have attended a course of Mental Diseases and of Practical Pharmacy (25 meetings), must have been properly instructed in Vaccination at a public vaccination station, and must have attended at least 20 cases of labour and the Practice of a Lying-in Hospital. The University also requires further study in various special subjects: Ophthalmology, Diseases of the Ear, Throat, and Nose, Venereal Diseases, Tuberculosis, Fevers, Vaccination. The final year consists of three intensive terms of study: one devoted to Midwifery and Diseases of Women, one to Surgery, and one to Medicine.

There are four Professional Examinations, the first comprising Botany, Zoology, Physics, and Chemistry; the second comprising Anatomy and Physiology; the third comprising Materia Medica and Therapeutics and Pathology; and the fourth or final, comprising Medical Jurisprudence and Public Health, Surgery and Clinical Surgery, Practice of Medicine and Clinical Medicine, and Midwifery and the Diseases peculiar to Women and to Infants.

The degrees of M.D. (Doctor of Medicine) and Ch.M. (Master of Surgery) are granted to candidates, not under 24 years of age, who have previously obtained the double bachelorship, on submitting an approved thesis and completing examinations in Clinical Medicine for M.D., and in Surgical Anatomy, operations on the dead body, and Clinical Surgery for Ch.M. The higher degree of Doctor of Philosophy (Ph.D.) is also conferred in the Faculty of Medicine. Candidates must already have obtained a degree (or equivalent diploma) from an approved University or College, and must prosecute a course of special study or research for two or three years and give evidence of satisfactory progress. A thesis must be presented for approval by the Senate on the recommendation of a Special Committee. The candidate may be required to undergo an oral or other examination on the subject matter of the thesis.

Post-graduate Medical Teaching is available under the auspices of Glasgow Post-Graduate Medical Association, which is representative of practically all the Teaching Institutions in Glasgow. Weekly demonstrations for practitioners are given throughout the winter and spring, and comprehensive courses of instruction during the summer and autumn. There is a General Medical and Surgical Course during the last two weeks of August and the first two weeks of September. This is a whole-time course and includes most of the subjects of interest to the general practitioner. Arrangements have been made whereby a limited number of graduates may become attached to wards or out-patient departments nominally as clinical assistants for definite periods throughout the year.

There are many Bursaries, Scholarships, and Prizes in connexion with the Medical Course.

Clinical Studies are carried on mainly at the ROYAL INFIRMARY—824 beds, including the Ophthalmic Institution. Other centres for clinical instruction are the Western Infirmary (600 beds) the Victoria Infirmary, and other general hospitals in the city. Facilities for the study of special branches are afforded by the Royal Hospital for Sick Children (350 cots), the Royal Mental Hospital, Hawkshead Asylum, the City Fever Hospital, the Royal Maternity Hospital, the Samaritan Hospital, the Eye Infirmary, and the Bridge of Weir Sanatorium.

Anderson College of Medicine

Courses are given at Dumbarton-road, Glasgow, W., which qualify for all the licensing boards and for the Universities of Oxford, Cambridge, London, Durham, Edinburgh, and Glasgow (the latter two under certain conditions). Extensive accommodation is provided for practical anatomy, chemistry, botany, zoology, physiology, pharmacy, and operative surgery. Women students are admitted on the same terms as men, and the Carnegie Trust extends its benefactions to *students of the College. Candidates for the L.D.S.* can obtain the full medical curriculum; the courses special to dentistry are conducted at the Dental Hospital, Glasgow.

The following are additional centres of instruction:—

Glasgow Western Infirmary

This hospital of 650 beds adjoins the University. Special wards are set apart for diseases of women, throat, nose, and ear, and for affections of the skin. In the out-patient department there are special clinics for diseases of women and for diseases of the throat, ear, nose, teeth, skin, venereal disease, and electrotherapeutics. This is the radium centre for Glasgow and the West of Scotland. The clinical courses are given by the physicians and surgeons, each of whom conducts a separate class, and students require to enter their names at the beginning of the session for the class which they propose to attend. Special instruction is given to junior students by tutors or assistants, and clinical clerks and dressers are selected from the members of the class. In the pathological and bacteriological departments the courses are both systematic and practical, and extend through the winter and following summer; these are likewise recognised by the University for graduation. In addition post-graduate courses are held. Eighteen resident assistants are appointed annually from those who have completed their course. In the Clinical Laboratory students receive laboratory instruction from the lecturer on clinical methods. A new Ophthalmological Department is being erected where special courses will be held.

Victoria Infirmary

This institution, situated at Langside, and having its office at 40, St. Vincent-place, Glasgow, has 427 beds, and is the third of the extensive general hospitals in Glasgow to afford opportunity for clinical instruction to students. In addition to a full general staff there is a clinical research laboratory with pathologists and bacteriologists attached; radiological instructor, and a full assortment of specialists. The Bellahouston Dispensary, also with a clinical staff, is conducted in connexion with the Victoria Infirmary. A wing for paying patients opened three years ago with 32 beds is now being extended to contain 80 beds. The extension should be completed by the end of 1934.

Royal Hospital for Sick Children, Glasgow

This institution consists of: (1) a hospital at Yorkhill containing 275 cots, built on an elevated and central site close to the University; (2) an out-patient department in West Graham-street; and (3) a country branch at Drumchapel, Dumbartonshire, containing 80 cots. There are one professorship and four lectureships in the University of Glasgow in connexion with the hospital, one professorship and one lectureship on the medical diseases of infancy and childhood, one lectureship on surgery and orthopædics in relation to infancy and childhood, one lectureship on biochemistry in relation to infancy and childhood, and one research lectureship on the pathology of the diseases of infancy and childhood. The lectures are both systematic and clinical, but particularly and chiefly the latter. In addition, special facilities are given for post-graduate study. Resident house physicians and surgeons are appointed every six months, in April and October.

Glasgow Royal Maternity and Women's Hospital

The average number of patients in the hospital at Rottenrow is 164. There are also over 4000 mothers attended per annum in their own homes. The work of the antenatal wards with their 50 beds is supplemented by large antenatal clinics where over 5000 new patients are seen in the course of the year. Well-equipped research laboratories were opened in 1926. A pædiatrician gives daily attendance and the practice of the hospital affords a good field for post-graduate study.

Glasgow Royal Samaritan Hospital for Women

The hospital has 160 beds and offers excellent facilities for clinical instruction in the diseases peculiar to women. Lectures and clinical demonstrations are given by members of the surgical staff to students and to post-graduates; and the hospital is represented on the Board of the Glasgow Post-Graduate Medical Association formed for coördinating post-graduate medical teaching in all the hospitals. The Royal Samaritan Lectureship in Gynæcology is a University lectureship associated with the hospital.

Glasgow Lock Hospital

The hospital at 41, Rottenrow, Glasgow, contains 84 beds and 16 cots for the treatment of females suffering from Venereal Diseases. There is also a Labour Ward, and a well-equipped Dispensary for out-patient attendances. There is a bacteriological laboratory, equipped with modern appliances, where continuous research work is done. Large University classes are held on the subject of female venereal disease. Post-graduate classes are also held. Recently the hospital has been completely renovated and modernised.

Glasgow Eye Infirmary

The wards and dispensary at Berkeley-street and Charlotte-street are recognised by the University for the purpose of instruction in ophthalmology for graduation in medicine at the University. A venereal centre has been established, and a branch dispensary has been opened in Clydebank. Post-graduate classes are held.

Glasgow Ear, Nose and Throat Hospital

The hospital contains 57 beds. At out-patient and indoor departments at 306, St. Vincent-street, clinical instruction is given. A research department has been installed, and post-graduate courses are held during the year.

Queen Margaret College

Queen Margaret College (Women's Department of the University) is an integral part of the University of Glasgow. The classes are taught by professors of the University and other lecturers appointed by the University Court, and it is governed by the University Court and Senate. The curricula, regulations, and fees are the same as those of the male students, and the University degrees are open to women on the same conditions as to men. The school of medicine is a special feature of the College, and gives full preparation for the medical degrees of the University. The women students attend classes in the various University Buildings at Gilmorehill, the Royal Infirmary, the Western Infirmary, and the Victoria Infirmary. Facilities for clinical work are given in the Royal, Western, and Victoria Infirmaries, in the Maternity, Royal Sick Children's, and other hospitals. The Arthur Scholarship is open every third year to students of first year; other Bursaries are open in Arts and Medicine, and women are admitted to certain University bursaries and fellowships.

St. Mungo's College

The classes in St. Mungo's College (vide Glasgow Royal Infirmary) qualify for the medical and dental qualifications of the English, Scotch, and Irish Conjoint Boards, and, under certain conditions, for the various universities, including the University of London. Students who have fulfilled the conditions of the Carnegie Trust are eligible for the benefits of this Trust during the whole course of their studies at St. Mungo's College. Further particulars can be obtained from the Secretary of the Medical Faculty.

UNIVERSITY OF ST. ANDREWS

Four Degrees in Medicine and Surgery are conferred by the University of St. Andrews (United College, St. Andrews, and University College, Dundee)—viz., *M.B.*, *Ch.B.*, *M.D.*, *Ch.M.*, a Diploma in Public Health, Diploma in Dental Surgery (*L.D.S.*), and a Diploma in Public Dentistry (*D.P.D.*).

The extent and standard of the Preliminary Examination is determined by the Scottish Universities Entrance Board, constituted under Ordinance No. 70 of the Scottish University Courts (General No. 3—Regulations as to Admission to the Scottish Universities for purposes of graduation), in accordance with the terms of that Ordinance. A degree in Arts or in Science in any of the Universities of the United Kingdom and in some colonial and foreign universities exempts. The Preliminary Examination for graduation in Medicine and Surgery, Arts or Science, of the University of St. Andrews is accepted as equivalent to the Registration Examination required by the General Medical Council (the certificate to include the required subjects). Also the Final Examination for a degree in Arts or Science.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates must have been engaged in medical study for at least five years. In each of the first four years the candidate must have attended at least two courses of instruction in one or more of the subjects of study specified below, each course extending over a session of not less than five months, either continuous or divided into two terms, or alternatively, one such course along with two courses, each extending over a session of not less than two and a half months. During the fifth or final year the candidate shall be engaged in clinical study for at least nine months at the Infirmary of Dundee or at one or more of such public hospitals or dispensaries, British or foreign, as may be recognised for the purpose by the University Court. The candidate must have received instruction in each of the following subjects of study, including such examinations as may be prescribed in the various classes—viz., Anatomy, Practical Anatomy, Chemistry, Materia Medica, Physiology, Practice of Medicine, Surgery, Midwifery and the Diseases peculiar to Women and Infants, Pathology, Bacteriology, Practical Chemistry, Physics, Elementary Botany, Elementary Zoology, Practical Physiology, Practical Pathology, Forensic Medicine, and Public Health. The candidate must have attended for at least three years the Medical and Surgical Practice either of the Infirmary of Dundee or of a General Hospital elsewhere with not fewer than 80 patients, with a distinct staff of physicians and surgeons, and recognised for the purpose by the University Court. Additional subjects of study are Practical Pharmacy, Mental Diseases, Practical Midwifery, Operative Surgery, Vaccination, Children's Diseases, Fevers, Ophthalmology, Diseases of the Ear, Throat, and Nose, Anæsthetics, Dermatology, Venereal Diseases, Tuberculosis, and Post-mortem Examinations.

With respect to the places and institutions at which the studies of the candidate may be prosecuted the following regulations shall have effect: 1. Two of the five years of medical study must be spent in the University of St. Andrews. 2. The remaining three years may be spent in any University of the United Kingdom or in any Indian, Colonial, or Foreign University recognised for the purpose by the University Court, or in such medical schools or under such teachers as may be recognised for the purpose by the University Court. Women are admitted to graduation in Medicine.

Professional Examinations for the Degrees of Bachelor of Medicine and Bachelor of Surgery.—Each candidate will be examined both in writing and orally, and also clinically where the nature of the subject admits, in the following divisions—viz., first, in Botany, Zoology, Physics, and Chemistry; second, in Anatomy and Physiology; third, in Materia Medica, Pathology and Bacteriology, Forensic Medicine and Public Health; and fourth, in Surgery, Clinical and Operative Surgery, Practice of Medicine and Clinical Medicine, and Midwifery and Gynæcology (Systematic and Clinical).

University College, Dundee

The Medical School in St. Andrews University is carried on as follows. Part or whole of the medical curriculum of St. Andrews University must be taken here. Provision is made by St. Andrews University for instruction in the work of the first two years, including Anatomy and Physiology, in both St. Andrews and Dundee. The last three years of the curriculum must be taken in Dundee in the medical school.

Post-graduate courses are given in connexion with the Dundee Royal Infirmary during the spring and summer months.

Dundee Royal Infirmary

This institution has 450 beds. In addition to the ordinary Medical and Surgical Wards, there are special departments for Midwifery (In- and Out-door), for Diseases of Women, of Children, of the Eye, of the Ear, Nose, and Throat, and of the Skin; and for Pathology, Radiology, Electrotherapeusis, and Electrocardiography. The Pathological Department has recently been reconstructed and enlarged. Clinical teaching is given to students by the Honorary Staff; post-mortem examinations are conducted by the Pathologist. All courses of instruction are recognised by the University of St. Andrews and the other Universities and Boards of the United Kingdom. Ten Resident Medical Officers are appointed every six months. Clinical clerks and dressers are attached to the Physicians and Surgeons, and Students are appointed as assistants in the pathological department. Post-graduate classes are held in May and June. Further information may be obtained from the Medical Superintendent.

SCOTTISH MEDICAL CORPORATIONS GRANTING DIPLOMAS

CONJOINT EXAMINING BOARD

The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow have made arrangements by which, after one series of examinations, held in Edinburgh or Glasgow, or both, the student may obtain the diplomas of the three bodies. This is the Scottish Conjoint Board. The three bodies grant their Single Licences only to candidates who already possess legal qualifications in Medicine or Surgery.

The hospitals which are recognised by the Scottish Conjoint Board as places where professional study for their diplomas can be pursued are all those institutions which feed the medical faculties of the universities, as well as all the places which are recognised by the English and Irish Conjoint Boards.

Professional Education.—The candidate must produce certificates or other satisfactory evidence of having attended the following separate and distinct courses of instruction: Physics, 1 term; Elementary Biology, 2 terms; Elementary Inorganic and Organic Chemistry, 2 terms; Anatomy Lectures, 2 terms; Practical Anatomy, 5 terms; Physiology Lectures, 2 terms; Practical Physiology (including Histology, Biochemistry, and Biophysics), 3 terms; Materia Medica and Practical Pharmacy, 2 terms; Pathology (including Practical Pathology), 3 terms; Practice of Medicine, 2 terms; Clinical Medicine, 3 terms; Principles and Practice of Surgery, 2 terms; Clinical Surgery, 3 terms; Midwifery and Gynæcology, 2 terms; Diseases of Children, 1 term; Medical Jurisprudence, 1 term; and Public Health, 1 term. The certified attendance on lectures, demonstrations, and practical work must not be less than three-fourths of the total number of roll-calls. Every student undergoes a course of Practical Midwifery, but before attending at labours he is required to attend a course of lectures on Surgery and Midwifery and to hold the offices of Clinical Medical Clerk and Surgical Dresser.

The student must attend for 27 months the Medical and Surgical practice of a public general hospital containing on an average at least 80 patients available for clinical instruction and possessing distinct staffs of physicians and of surgeons. He must act as Surgical Dresser and Medical Clinical Clerk for not less than nine months in the wards in each case, and receive practical instruction in administration of anæsthetics. He must attend for three months the practice of a public dispensary especially recognised by any of the above authorities, and three months' attendance at the out-patient department of a recognised general hospital. This attendance should be made after the student has passed the First and Second Examinations.

Candidates are also required to attend the following three-monthly courses: Diseases and Injuries of the Eye; Insanity; Infectious Diseases; Gynæcology; Tuberculosis; Diseases of the Skin; Diseases of the Ear, Nose, and Throat; Radiology; Orthopædics; Diseases of Children. The curriculum lasts for five years, the fifth year being devoted to clinical work.

There are four professional examinations:—

First Examination includes Systematic and Practical Biology, Chemistry, and Physics.

The Second Examination must be Written, Practical, and Oral, and consist of the following subjects: (1) Anatomy and Embryology, and (2) Physiology, including Histology (if not included in Anatomy), Biochemistry, and Biophysics. Candidates may be admitted to this Examination on production of the necessary certificates of curriculum.

The *Third Examination* must be Written, Practical, and Oral, and consist of the following subjects: (1) Pathology, including Bacteriology and Morbid Anatomy, and (2) Pharmacology (Theoretical and Practical), including Pharmacological Chemistry, the Principles of Therapeutics, and Prescription Writing. Candidates may be admitted to this Examination on production of the necessary certificates of curriculum.

The *Final Examination* must consist of the following subjects[1]: (1) Medicine, including Therapeutics, Applied Anatomy and Physiology, and Clinical Pathology with Practical Medicine; (2) Surgery, including applied Anatomy and Physiology, Clinical Pathology, with Practical Surgery; (3) Midwifery and Diseases of Women, Clinical Obstetrics and Gynæcology, with Practical Midwifery; and (4) Medical Jurisprudence and Public Health. Medicine, Surgery, and Midwifery must be taken together, and Medical Jurisprudence and Public Health, and not earlier than on the conclusion of five Winters and five Summers of Medical Study, provided that a period of 33 months has elapsed since passing the Second Professional Examination. The Schedule for the

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[1] Candidates at the Final Examination may be examined on Diseases of Children, Fevers, Tuberculosis, Insanity, Skin Diseases, Diseases and Injuries of the Eye, Diseases of the Ear, Throat, and Nose, Radiology, Venereal Diseases, Orthopædics, Vaccination, and Anæsthetics.

Final Examination must contain a summary of the entire Course of Study, and, properly attested or proved by Certificates, must be lodged with the Inspector, and the fee paid, not later than two weeks before the examination. At the same time there must be produced a Certificate to show that the Candidate is not less than 21 years of age. No Candidate can be exempted from examination on any subject of the Final Examination unless he has already passed in the subject at this Board.

In addition to the Written and Oral Examinations all Candidates must be subjected to Clinical Examinations in Medicine, Surgery, and Midwifery and Gynæcology, which shall include the Examination of Patients, Physical Diagnosis, the Clinical use of the Microscope and of other instruments, Clinical Chemistry, Surgical Appliances, Bandaging, Surface markings, Skiagrams, &c. The Oral Examination includes the recognition of specimens. All Candidates for the Final Examination must complete the three portions (Medicine, Surgery, and Midwifery) within a period of 19 months.

There are four periods of examination annually.

The Registrar in Edinburgh is Mr. David Thomson, 18, Nicolson-street; and the Registrar in Glasgow, Mr. David Willox, 242, St. Vincent-street, to whom fees and certificates must be sent for the respective examinations, and from whom particulars of fees can be obtained.

School of Medicine of the Royal Colleges, Edinburgh

The Lectures in this School qualify for graduation at Edinburgh and other Universities, for the Examinations of the Conjoint Boards of Edinburgh and Glasgow, London, and Dublin. The number of students attending varies from year to year, and in recent years the average number has been about 600. In accordance with the Regulations of the University of Edinburgh one-half of the qualifying classes required for graduation there may be attended in this School, the fees paid for such classes being the same as those for the corresponding University classes. Special classes of instruction for Dental students are included in the curriculum. Post-graduate courses are conducted in conjunction with the University. Further particulars regarding the School, also its calendar (price 9*d*., including postage), may be had on application to the Dean of the School, Surgeons Hall, Edinburgh.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

In addition to the Diplomas granted by the Scottish Conjoint Board, the Royal College of Physicians grants its Single Licence to candidates whose names are already on the Medical Register.

The Royal College of Physicians of Edinburgh grants a *Membership* and a *Fellowship*.

Membership.—A candidate, who must be a Licentiate of a British or Irish College of Physicians, or a graduate in medicine of a University, approved by the Council, and 24 years of age, is examined in medicine, therapeutics, and in any branch of the departments of medicine specially professed, such as general pathology, psychology, public health, obstetrics, gynæcology, diseases of children, tropical medicine, or medical jurisprudence.

Fellowship.—The Fellows are selected from the ranks of the *Members*.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

The Royal College of Surgeons of Edinburgh admits to the examination for its Single Licence any candidates who hold a Diploma in Medicine of any British, Indian, or Foreign university or of any British College of Physicians, or of the Society of Apothecaries of London or Apothecaries' Hall, Dublin, granted under the provisions of the Medical Act, 1886, whose preliminary examination and course of professional study is proved to be sufficient to fulfil the requirements of the College, or to those who have passed a full examination for any of the above. Female practitioners are admitted to the Licence of the College and also to the Fellowship, and the regulations apply to practitioners of either sex.

The College grants a diploma of Fellowship after examination to the holders of British surgical degrees or diplomas and the holders of recognised degrees of the Universities of Canada, Australia, and New Zealand.

The Fellowship.—Candidates must be 25 years of age and in practice for at least two years. The examination is written and viva voce, and includes surgery and surgical anatomy, operative surgery, and clinical practice. One optional subject must also be taken, the range of these specialisms covering nearly every branch of medicine. Candidates are not allowed to appear for more than three times at the examinations, unless by permission of the President's Council. Three weeks' notice of intention to appear for examination must be given by the candidate to the College.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

The Royal Faculty of Physicians and Surgeons of Glasgow grants a Fellowship and a Licence to be held separately. The Licence is granted as a separate qualification to qualified practitioners in Medicine after examination in surgery, including surgical anatomy and clinical surgery.

Fellowship.—The Fellowship of the Faculty is granted after examination in medicine or surgery, together with an optional subject, which may be anatomy or physiology, or be selected from any special branch of medicine or surgery. Fourteen days' notice must be given by the candidate to the Faculty. In certain circumstances Fellows may be elected as a mark of distinction. Address of Registrar: 242, St. Vincent-street, Glasgow.

MEDICAL EXAMINING BODIES AND SCHOOLS IN IRELAND

UNIVERSITY OF DUBLIN, TRINITY COLLEGE (SCHOOL OF PHYSIC)

Matriculation.—University students take the Entrance of Trinity College and a Junior Freshman Term or a special Medical Preliminary: Extern Students, any examination recognised by the General Medical Council.

Pre-registration Examination in Elementary Physics and Chemistry.—Before beginning the five years' Medical curriculum students must pass an examination in elementary Physics and Chemistry. This examination is held at the end of September, in January, in March, and in July. Courses in preparation for it may be taken in the School of Physic.

Degrees in Medicine (M.B.), Surgery (B.Ch.), and Midwifery (B.A.O.).—Candidates for these degrees must be of B.A. standing and must be for at least five academic years on the books of the Medical School, reckoned from the date of registration. The Arts course may be taken concurrently with the Medical course, and the B.A. degree need not be taken before the final medical examinations, but the Medical degrees are not conferred without the Arts degree. The following courses must be attended: (1) Botany, Zoology, Physics, and Chemistry: Descriptive and Applied Anatomy; Histology, Physiology and Applied Physiology; Pathology and Bacteriology; Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene; Practice of Medicine; Surgery; Midwifery and Gynæcology. (2) Three courses of nine months' attendance on the Clinical Lectures of Sir Patrick Dun's or other recognised Hospital. (3) Practical Vaccination, one month's instruction. (4) Mental Disease, three months. (5) Practical Midwifery with Clinical Lectures, including Antenatal and Infant Hygiene Clinics, also not less than 20 personally conducted cases, five months, one of which must be as a resident intern student. (6) Ophthalmic Surgery, three months. Three groups of examinations have to be passed. Preliminary Scientific Examination, including Physics and Chemistry, Botany, and Zoology. Intermediate Medical, Part I., including Anatomy and Physiology, Biochemistry and Histology; Part II., including Applied Anatomy and Applied Physiology; and the Final Examination, which is divided into Part I., Materia Medica and Therapeutics, Pathology and Bacteriology; and Part II., Medicine, including Clinical Medicine, Hygiene, Jurisprudence, and Mental Diseases; Surgery, including Operative and Ophthalmic Surgery; Midwifery and Gynæcology. Part I. may be passed in the fourth year, and Part II. completed at the end of the fifth.

Doctor in Medicine.—A Doctor in Medicine must have passed all the qualifying examinations and must be a B.A. of three years' standing. He must also submit a thesis and pass an Examination before the Regius Professor of Physic.

Master in Surgery.—A Master in Surgery must be a Bachelor in Surgery of the University of Dublin of not less than three years' standing and must produce satisfactory evidence of having been engaged for not less than two years from the date of his registration in the study or study and practice of his profession. He must then pass a special examination.

Master in Obstetric Science.— A Master in Obstetric Science must be a Bachelor in Obstetric Science of two years' standing, and must produce evidence of having been engaged in the study or practice of Obstetric Medicine and Surgery during two years. He is then required to pass a special examination.

Diploma in Gynæcology and Obstetrics.—A post-graduate diploma is conferred upon registered medical practitioners who take a six months' course at the Rotunda Hospital or other recognised institution, a six months' course in Trinity College, and then pass a special examination. The minimum time required for the complete course is nine months.

Bachelor in Dental Science and Master in Dental Science.—The regulations under which these degrees are awarded can be obtained by application to the Registrar of the School of Physic.

All Degrees and Courses of Instruction are open to women students.

Scholarships and Prizes.—1. Medical and Surgical Travelling Prizes, £100, awarded in alternate years. 2. Bicentenary Memorial Prize, £30, awarded yearly, and given to the Travelling Prizeman. 3. Sir John Banks Prize and Medal. 4. Edward Hallaran Bennett Prize and Medal. 5. FitzPatrick Scholarship, awarded on results of Final Examination (interest on £1000). 6. Medical Scholarship, £20 per annum for two years, awarded in Chemistry, Physics, Botany, and Zoology. 7. Medical Scholarship in Anatomy and Physiology, £20 per annum for two years. 8. Henry Hutchinson Stewart Scholarships, one in Botany, Zoology, Chemistry, and Physics, and another in Anatomy and Physiology, awarded annually and valued at £10 per annum for three years. 9. Henry Hutchinson Stewart Scholarship in Mental Diseases, awarded from time to time, £50 per annum for three years. 10. John Mallet Purser Medal, awarded annually in Physiology. 11. Daniel John Cunningham Medal and Prize, awarded annually in Anatomy. 12. Begley Studentship, £40 per annum for four years, awarded annually. 13. Kingsmill Jones Memorial Prize, awarded annually in Natural and Experimental Science, £15. 14. O'Sullivan Memorial Scholarship, £48, awarded annually for excellency of record in school. 15. Adrian Stokes Memorial Fellowship, awarded every second year, the holder to carry out original work in Pathology and Bacteriology, about £320. 16. Aquilla Smith Prize, awarded annually in the Final Medical Examination, Part I., about £10. 17. Walter G. Smith Prize, awarded annually in Materia Medica and Therapeutics, about £10. 18. De Renzy Centenary Prize in Public Health, awarded annually, £15.

Post-graduate Instruction.—Arrangements have been made, with the approval of the Board of Trinity College, for a post-graduate course of instruction at the School of Physic during the autumn from Monday, Sept. 17th, to Saturday, Oct. 6th. Women graduates can be accommodated at Trinity Hall.

NATIONAL UNIVERSITY OF IRELAND

Matriculation.—All students must pass a matriculation examination; the examination taking place in June and September in Dublin, and at certain local centres, includes five subjects, three of which must be Irish, English, and mathematics. All students must pass in Irish except students not born in Ireland, and other students whose home residence shall have been outside Ireland during the three years immediately preceding their matriculation; but all such students will be expected to attend a course of instruction in Irish Literature and History prior to obtaining any degree in the University. The following are the subjects for examination: (1) Irish. (2) Latin. (3) Greek. (4) French. (5) German. (6) Italian. (7) Spanish. (8) Portuguese. (9) Welsh, or any other modern language approved by the Senate. (10) English. (11) Mathematics. (12) History. (13) Geography. (14) Applied Mathematics, or Physics as an alternative. (15) Chemistry. (16) Botany. (17) Agricultural Science. (18) Commerce. (19) Music, and for women candidates only (20) Physiology and Hygiene. Students entering for degrees in Medicine or Dentistry, if not already registered by the General Medical Council, must take Irish, Latin, English, Mathematics, and a fifth subject.

The medical degrees granted are :—

M.B., B.Ch., B.A.O.; M.D., M.Ch., M.A.O., Ph.D.—Printed forms of application for admission to any medical examination may be had from "The Registrar, The National University of Ireland, 49, Merrion-square, Dublin."

The Constituent Colleges of the National University of Ireland at which the full curriculum for medical degrees can be obtained are University College, Dublin; University College, Cork; and University College, Galway.

University College, Dublin

Matriculation.—Almost all the students of the College are matriculated students of the National University of Ireland. The pre-registration examination in physics and chemistry is taken after matriculation either at the beginning of or during the winter session. The course is of five years' duration and dates from the passing of the pre-registration examination.

Degrees of M.B., B.Ch., and B.A.O.—The First Examination includes Applied Physics, Applied Chemistry, Botany, Zoology, and Applied Biology. The examination may be taken in two parts: Part I., Physics and Chemistry; Part II., Botany and Zoology. Honours may be obtained only when both parts are taken as one examination. The Second Examination includes Anatomy and Physiology. Both must be passed at the same time. The Third Examination (Part I.) includes Pathology, Materia Medica, Pharmacology, and Therapeutics. Part II. (Third Examination), taken at the end of the Fourth Winter Session, includes Hygiene and Medical Jurisprudence.

The Final Examination in Medicine, Midwifery, Surgery, and Ophthalmology includes both the theoretical and the clinical branches. No student can enter for the M.B., B.Ch., or B.A.O. until the end of the fifth year after registration, when the curriculum has been completed. The degree of M.D. may be obtained either by examination or on published work.

A Post-graduate Course is held each year, beginning about the middle of June. The D.P.H. Course extends over the year, beginning at the opening of the session.

University College, Cork

In the School of Medicine students must have passed the Matriculation Examination of the University or some other recognised examination, and a preliminary examination recognised by the General Medical Council.

Medical Students who have passed the First Professional Examination of the Conjoint Boards of Ireland, England, or Scotland may be admitted to the rank of second-year students on making application to the Council. Similarly, students who have passed the Second Professional Examination of the same Boards may be admitted to the rank of third-year students; and those who have passed the Third Professional Examination of the Dublin Colleges, or of the Edinburgh Colleges and Glasgow Faculties, may rank as fourth-year.

The school is provided with physiological, toxicological, pathological, and pharmaceutical laboratories, materia medica, anatomical, and pathological museums, as well as a collection of surgical and obstetrical instruments and appliances. There are dissecting-rooms, well-appointed physical, chemical, and biological laboratories, a large natural history museum in the adjoining building, and part of the College ground is laid out as a botanical garden. The plant houses are well filled with plants and are open to the students in the class of Botany. The Library contains about 70,000 volumes and is open daily during term time to students. The Medical Museum occupies a large room erected at the northern end of the medical buildings. There are Students' Clubs for men and women students of the College and various athletic clubs.

Residence of Students.—Students not living at home, or with relatives or friends, sanctioned by their parents or guardians, are required to live in a hostel or in recognised lodgings, and register their addresses each session. The Honan Hostel, adjoining the College, is equipped by private endowment. A number of sets of rooms, together with recreation and common rooms, are provided for lay students who may desire to live there. For full particulars apply to the Warden. The Ursuline Convent, Blackrock, has a house of residence, quite separate from their Secondary School, for Catholic women students.

Clinical Instruction.—Students may attend the South Charitable Infirmary and County of Cork General Hospital, Cork North Charitable Infirmary and City of Cork General Hospital, the Mercy Hospital, the Cork District Lunatic Asylum, the Victoria Hospital for Diseases of Women and Children, the County Lying-in Hospital, Bon Secours, Fever, the District, and Ear, Eye, and Throat Hospitals.

Complete information with regard to class fees, scholarships, and prizes can be obtained from the Dean of the Medical Faculty, and in respect of the hospitals from the Secretaries.

University College, Galway

The College contains a well-lighted and ventilated dissecting room and an anatomical lecture theatre; physiological, pathological, pharmaceutical, chemical, and physical laboratories; anatomical, pathological, gynæcological, and materia medica museums; as well as large natural history and geological museums and an extensive library in which students can read and from which they can borrow books. In the School of Medicine there are 12 Entrance Scholarships, varying in value from £30 to £60 each, for which Medical Students compete with other students on the Entrance Course. In the Second, Third, and Fourth years three Scholarships in each year, value from £30 to £40 each, are reserved for Medical Students. H. H. Stewart Scholarships (£10 a year for three years) are awarded by the University in Anatomy and Physiology at Second Medical Examination amongst Students of the three constituent Colleges. Travelling Studentships (£200 a year for two years) are offered by the University for competition amongst Medical Graduates of the three Colleges of not more than two years' standing. Women students are eligible for all College and University Degrees, Distinctions, and Prizes. There are extensive grounds, a portion of which is occupied by a Botanic Garden and a portion is at the disposal of the College Athletic Union. There are several student societies in the College, including a Biological Society. There are abundant facilities for research and Post-graduate work in the Chemistry, Physiology, and Pathology departments. There are ample facilities for Women Students.

Clinical Instruction is given in the Galway Central Hospital and in the Galway Tuberculosis and Fever Hospitals. The CENTRAL HOSPITAL (300 beds) is completely renovated. In addition to the surgical and medical departments, there are now eye and ear, throat and nose, gynæcological and obstetrical, pathological, X ray, electrical and massage departments. Medical and Surgical Clinics are held on alternate days during term. Two Resident Physicians and two Resident Surgeons are appointed every six months. Resident Students are admitted. The hospital is open to qualified medical men for postgraduate work.

HOSPITALS AFFORDING RECOGNISED PRACTICE [1]

The following hospitals afford practice recognised by the Irish Universities and Corporation.

Sir Patrick Dun's Hospital

Classes both in Medicine and Surgery are held each morning at Grand Canal-street, Dublin, from 9 o'clock from the beginning of October till the end of June. Special classes for junior students will be held in the wards during the months of October, November, and December. A resident surgeon and resident physician, with salaries, are appointed annually. Six resident pupils are appointed every six months. Twelve surgical dressers and twelve clinical clerks are appointed each month. There are facilities for women students.

The practice of the hospital is open to all students, and the certificates are recognised by Dublin University, the National University, and Royal Colleges of Surgeons of England, Ireland, and Scotland. It is an official " Treatment Centre " for venereal diseases.

At the end of last year an out-patient department was fully equipped. It has medical, surgical, gynæcological, ear, nose and throat departments, and an accident department, with theatre and dressing dispensary. A valuable asset to the teaching responsibilities of the institution has thus been added.

Prizes and Medals.—Clinical medals and prizes amounting to about £21 each will be awarded in medicine and in surgery respectively in accordance with the will of the late Rev. Samuel Haughton, M.D., S.F.T.C.D. Candidates who fail to obtain these medals and prizes will be awarded special certificates in medicine and surgery provided they show sufficient merit.

Adelaide Hospital

Two resident surgeons and four or more resident pupils are elected every six months.

Prizes.—The Hudson Scholarship, £30 and a Gold Medal, as well as the Hudson Prize, £10 and a Silver Medal, are awarded at the end of the session for proficiency in medicine, surgery, gynæcology, and pathology. In addition to this prizes are awarded in gynæcology and dermatology, and in clinical medicine and surgery for junior students. Wallace Beatty Memorial Bursaries are granted at the discretion of the Medical Board at the beginning of the Winter session. The certificates of attendance are recognised by all the Universities and licensing bodies in the United Kingdom. Post-graduate work in the hospital is in conjunction with the course in Trinity College.

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[1] This list of the institutions recognised by the Conjoint Board of Ireland is supplemented in the regulations of the Colleges by those hospitals mentioned as recognised institutions in Scotland and England. The recognised facilities for clinical instruction in some of the Irish centres have been described. The secretaries of the hospitals will always be ready to answer inquiries or to give additional information.

Mater Misericordiæ Hospital

This hospital, under the care of the Sisters of Mercy, containing 410 beds, is open at all hours for the reception of accidents and urgent cases. Clinical instruction is given by the staff. Ophthalmic surgery and surgery of the nose and throat are taught in the special wards and in the dispensary. Surgical operations are performed daily. Connected with the hospital are extensive dispensaries, which afford valuable opportunities for the study of general medical, dermatological, surgical diseases, and accidents; a fully equipped biochemical laboratory, a modern electro-massage department, an electrocardiograph room, and radiological department. Instruction is given on pathology and bacteriology. A special post-graduate course in connexion with the medical school of University College, Dublin, is held each June. Four house physicians, eight house surgeons, and 18 resident pupils are elected annually. Dressers and Clinical clerks are appointed regularly and certificates given for merit. Leonard Prizes will be offered for competition annually. Certificates of attendance are recognised by all the Universities and licensing bodies in the United Kingdom. There is a private hospital for the reception of medical and surgical cases. A training school and a home for trained nurses are connected with the hospital, and nurses who have passed a qualifying examination can be obtained on application to the Lady Superioress. Entries can be made with any of the physicians or surgeons, or with the Registrar, 8, Fitzwilliam-place, Dublin.

Mercer's Hospital *

This hospital, situated in the centre of the city of Dublin, is in closest proximity to the Medical Schools, any of which can be reached on foot within five minutes, and from its position receives a large number of cases of emergency surgery in addition to the ordinary medical and surgical practice. Extensive alterations and reconstruction have brought the wards up to date. Additions have been made in the radiographic and electrocardiographic departments. Classes for pupils are held on alternate mornings in the medical and surgical wards. There is a large out-patient department available for the teaching of medicine, surgery, and gynæcology. Arrangements for clinical instruction are made with Cork-street Fever Hospital. A gold medal is awarded annually to the best pupil on the books of the hospital, and an annual prize of £25 has been added. A house surgeon and a house physician are appointed annually, and there is residential accommodation for six men and two women pupils. Clinical clerks and dressers are appointed from the classes.

Richmond, Whitworth, and Hardwicke Hospitals

These House of Industry hospitals, North Brunswick-street, Dublin, contain 325 beds—140 for surgical cases, 75 for medical cases, 78 for fever and other epidemic diseases, and an auxiliary wing with 32 beds, devoted mainly to throat, nose and ear, and skin diseases. Three resident physicians and three resident surgeons are appointed each half year. Resident clinical clerks are appointed each quarter, and it has always been the aim of the Medical Board to ensure that each student spends at least six months in residence. In addition, junior students are appointed as extern clinical clerks and surgical dressers. Women students are eligible on the same terms as men. Ample facilities exist for post-graduate work in the various special departments, as well as in general medicine and surgery. Extensive alterations and improvements have recently been made in the X ray, electrotherapeutic, and electrocardiographic departments. Two open-air huts to accommodate ten patients have been erected in the spacious Whitworth grounds. A new students' residency has been opened. This contains facilities for 20 male and 8 female resident students.

Royal City of Dublin Hospital

The hospital contains 160 beds and a special wing for the treatment of fevers and contagious diseases founded by the late Mr. Drummond. There is a large nursery where special opportunities are afforded for the study of diseases of children, both medical and surgical. There are also special wards for ophthalmic, aural, and gynæcological cases; also a department for the Erlangen Treatment by deep therapy. There is a largely attended out-patient department, where students are allowed to attend accidents and dress cases under supervision. Six resident pupils are appointed every three months. A house surgeon and a house physician are appointed annually.

Dr. Steevens' Hospital

This hospital, at Dublin (Kingsbridge), contains 180 beds. There is accommodation for 10 resident pupils, each of whom is provided with a separate bedroom, and board is supplied by the hospital at a reasonable rate. There is an electric massage department, a "sun-ray" and diathermy department, and an X ray department. There are also two V.D. wards and a largely attended V.D. treatment centre, as well as a large ward reconstructed and re-equipped and opened as open-air ward for tuberculous and other diseases of bone (25 beds) for females, two open-air verandahs for male surgical tubercular cases (14 beds), and children's ward (12 cots). Information as to terms for residency can be had from the Resident Surgeon at the Hospital.

Meath Hospital and County Dublin Infirmary

The hospital contains 150 beds, available for clinical teaching, both medical and surgical. There is a separate fever block which contains 40 beds. A special ward has been set apart for the reception of children. Special departments are as follows: Ear, Nose, and Throat, Dental, Diseases of Women, Skin, and Genito-urinary System. Clinical Teaching includes classes for both Senior and Junior Students. The Joseph Smyth Scholarship in Medicine, value £50, is awarded biannually. Gold and Silver Medals are given annually to the best answers in an examination in Clinical Medicine and Surgery. Prizes are also awarded to the Junior classes at the Sessional Examination. Two House Surgeons and a Resident Casualty Officer are selected each half-year from fully qualified pupils of the hospital. The Meath Hospital is within a few minutes' walk of the University of Dublin, the Royal College of Surgeons, The National University, and the Cecilia-street School of Medicine.

Jervis-street Hospital, Dublin *

This hospital contains 120 beds. Eight resident medical officers are appointed each year and facility is thus given to past students of the hospital to acquire experience as house surgeons. Resident students are provided with apartments, fuel, and light, free of charge. Arrangements have been made by which students of the hospital can have special fever training in Cork-street Fever Hospital, free of charge.

St. Vincent's Hospital and Dispensary

This hospital has 200 beds. Clinical lectures in medicine and surgery are held from October to June. Special classes for juniors from October to December. Pathological and bacteriological demonstrations are given every Thursday, and instructions in the use of laryngoscope and otoscope for senior students every Saturday. Medals and Prizes: the Bellingham gold medal in Medicine and the O'Ferrall gold medal in Surgery are offered for competition at the end of the summer session, as well as junior prizes, also the

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* No returns.

* No returns.

McArdle Memorial Prize, value £20. There are a large extern department and a new pathological laboratory. A new electrocardiographic department has been installed.

Rotunda Hospital

The Rotunda Hospital, Dublin, is the largest combined gynæcological and maternity hospital in the British Empire. Over 4000 confinements are attended annually, and upwards of 1000 gynæcological patients admitted. Students can take out their necessary gynæcological and midwifery practical courses. The work of the hospital is carried on continuously through the year, and consists of daily clinical instruction in the maternity department, and examination and operations in the gynæcological department. Qualified students are given facilities for studying and assisting in the management of all abnormal cases so far as is practical. An antenatal dispensary is held three times weekly and all students are encouraged to attend. A special class in gynæcological examination and diagnosis is conducted by the Assistants to the Master. In addition there is a special class in operative obstetrics, limited in number. The pathological laboratory is under the supervision of a skilled pathologist, who gives special classes at intervals. A Biochemist has just been appointed who is carrying out the Aschheim-Zondek test for pregnancy, and who is prepared to help any Post-graduates who are keen on doing research work on the material in the hospital. There is a fully equipped X ray installation under the care of a competent radiologist. A ward has been opened for the treatment of infantile conditions, and is under the care of a pædiatrician, who gives instruction in the out-patient department, which is held daily. The appointments on the staff of the hospital are given to qualified past students of the hospital who have taken the L.M., and consist of Extern Assistants for six months, one being appointed every three months. From these the Assistants to the Master are appointed. Women students can reside in the hospital on the same terms as men. The L.M. is granted by examination after a six months' course. The mess room and sleeping quarters have been decorated recently and reading rooms are provided. Three tennis courts and a standard squash rackets court are now available for the mess.

Coombe Lying-in Hospital

The Coombe Lying-in Hospital and Guinness Dispensary for the Treatment of Diseases peculiar to Women, Dublin, contains 70 beds, and consists of two divisions, one of which is devoted to lying-in cases and the other to the treatment of diseases peculiar to women. The hospital gives to men and women students and post-graduates a thorough training in obstetrics and gynæcology. Lectures are delivered, practical instruction given, and gynæcological operations are performed in the theatres daily. There is a large general dispensary, held daily, at which instruction is given on the diseases of women and children. There is a special afternoon dispensary held by the Master and his assistants, at which practical instruction in gynæcology is given. There is no extra charge for attendance at this dispensary, or at the prenatal clinic, held on three evenings a week, at which there are about 3000 attendances annually. Every year about 1200 women are delivered in the hospital and about 1500 on the district. There is accommodation for intern pupils, who enjoy exceptional advantages of acquiring a thorough knowledge of this branch of their profession. Women students can reside in the hospital. Clinical assistants are appointed from amongst the post-graduates as vacancies occur. Certificates of attendance at this hospital are accepted by all licensing bodies. Students can attend at any time. Plans for a new hospital of 136 beds, and a new residency for students, are now complete, and the building operations will begin in the near future.

Further particulars may be had on application to the Master or the Registrar at the Hospital.

National Maternity Hospital

This hospital at Holles-street, Dublin, consists of intern and extern maternity, gynæcological wards, and a dispensary for the treatment of diseases of women, an infant clinic, and an antenatal and postnatal branch. Every facility is given for the carrying out of practical work. Under-graduate and post-graduate courses are arranged at any time. Certificates of attendance at this hospital are recognised by all the licensing bodies. Clinical lectures are given daily and oral lectures four times per week. The L.M. Diploma is given by special examination, which is held four times a year. Total number of admissions last year 1700.

Further particulars can be obtained from the Master or from the Secretary.

QUEEN'S UNIVERSITY OF BELFAST

There are six degrees in the Faculty of Medicine of the University—viz., Bachelor of Medicine (M.B.), Bachelor of Surgery (B.Ch.), Bachelor of Obstetrics (B.A.O.), Doctor of Medicine (M.D.), Master of Surgery (M.Ch.), and Master of Obstetrics (M.A.O.). The University also grants a Diploma in Public Health and a Diploma in Psychological Medicine, particulars of which will be found in the University Calendar. The degrees of M.B., B.Ch., and B.A.O. are the primary degrees in the Faculty of Medicine, and are conferred at the same time and after the same course of study. No student is admitted to the final examination for these degrees until he has shown: (1) that he is a matriculated student of the University; (2) that he has completed the prescribed course of study in the Faculty of Medicine extending over a period of not less than five academic years from the date of his registration as a student of Medicine; (3) that he has passed the several examinations prescribed; (4) that he has attended in the University during three academic years at least the courses of study prescribed for such degrees (the Senate may accept, for not more than two academic years of the required five, courses of study pursued in any other University or School of Medicine approved by the Senate); and (5) that he has attained the age of 21 years. Every candidate for admission shall matriculate or fulfil such other test of fitness as may be prescribed by the Senate, or may be exempted from the matriculation examination by having passed similar examinations elsewhere.

For information as to Scholarships and Prizes, inquiry should be made of the Secretary of the University.

Primary Degrees of M.B., B.Ch., B.A.O.—All candidates for these degrees must satisfy the examiners in the subjects of four examinations.

The First Medical Examination.—The subjects of this examination are Chemistry (Inorganic and Organic), Experimental Physics, Botany, and Zoology. The examination will be divided into two parts which may be taken separately: I., Chemistry and Physics; II., Botany and Zoology.

The Second Medical Examination.—The subjects are Anatomy and Practical Anatomy, Physiology and Practical Physiology. Candidates who have previously passed the First Medical Examination may present themselves for this examination at the close of their second year.

The Third Medical Examination.—The subjects are: (1) Pathology and Practical Pathology; (2) Materia Medica, Pharmacology, and Therapeutics; (3) Medical Jurisprudence; (4) Hygiene. Candidates who have previously passed the Second Medical Examination may present themselves for Part I. of this examination at the close of the third year, and for Part II. at the end of the Winter Session of the fourth year. Attendance on a course in any subject of the Third Medical Examination shall not entitle a student to a certificate of attendance unless he has previously passed in all the subjects of the Second Medical Examination.

The Fourth Medical Examination.—The subjects are: (1) Medicine; (2) Surgery; (3) Midwifery and Gynæcology; (4) Ophthalmology and Otology. Candidates who have previously passed the Third Examination may present themselves for the Fourth Examination at the close of the fifth year, provided that they have fulfilled the necessary requirements as to attendance, &c., on the courses of instruction in the subjects of examination and on the clinical courses in the hospitals. Attendance on a course in any subject of the Fourth Medical Examination shall not entitle a student to a certificate of attendance unless he has passed in the subjects of Part I. of the Third Medical Examination.

Degrees of M.D., M.Ch., and M.A.O.—These degrees are not conferred until the expiration of at least three academic years, or in the case of graduates of the University in Arts or Science of at least two academic years, after admission to the primary degrees in the Faculty of Medicine. Every candidate must show that in the interval he has pursued such courses of study, or been engaged in such practical work as may be prescribed. These degrees may be conferred by the Senate either (*a*) after an examination, which includes written, oral, clinical, and practical examinations; or (*b*) on the submission of a thesis or other evidence of original study or research, to be approved by the Faculty of Medicine after an oral or other examination of the candidate on the subject.

The Medical School.—The Donald Currie Chemical Buildings contain a lecture theatre, a preparation room, a chemical museum, a large class-room for elementary practical chemistry, laboratories for qualitative and quantitative analysis, rooms for water and gas analysis, dark room for photographic purposes and balance room, provided with all modern appliances. The Anatomical Department contains a large and well-lighted dissecting-room, a lecture-room, a professor's and demonstrator's room, a bone-room, and a laboratory for microscopic and photographic work. The Medical Museum is in the same building. The Jaffé Laboratories for Physiology comprise a lecture theatre, laboratories for practical work in chemical physiology, histology, and experimental physiology, and in addition small private research rooms, including balance, galvanometer, and centrifuge rooms. The J. C. White laboratories are fully equipped for research in biochemistry. The Institute of Pathology, which is adjacent to the Royal Victoria, Royal Maternity, and Children's Hospital, provides fully equipped accommodation for Pathology and Bacteriology, including class-rooms, demonstration room, lecture theatre, library museum. and research laboratories. There is an ample supply of material for investigation by graduates in morbid histology, clinical pathology, and the bacteriology of infectious diseases. A course in pathology or bacteriology is given to graduates, and members of this class have an opportunity of seeing the methods employed in the various investigations carried out in the department for the Public Health Committee of the Corporation in connexion with water-supply, sewage disposal, meat- and milk-supply, and the diagnosis of cases of infectious diseases. The certificate issued to members of the class in bacteriology qualifies for the D.P.H. degree. The Pharmaceutical Laboratory is fitted and equipped for the work of practically instructing students in the compounding and dispensing of medicines.

Clinical Instruction.—The following institutions are recognised by the University as affording proper opportunities for clinical instruction: the Royal Victoria Hospital, the Mater Infirmorum Hospital, the Belfast Hospital for Sick Children, the Royal Maternity Infirmary and Hospital, the Ulster Hospital for Women and Children (56 beds), the Benn Ulster Eye, Ear, and Throat Hospital (30 beds), the Belfast Ophthalmic Hospital (30 beds), the City Fever Hospital, Purdysburn (360 beds), the Union Fever Hospital (200 beds), and the Belfast District Lunatic Asylum, where the Purdysburn Villa Colony has 1350 beds.

Complete information can be obtained from the respective Secretaries.

Royal Victoria Hospital, Belfast

There are 436 beds. Students eligible for McGrath, McQuitty, Malcolm, Coulter Smyth, and Elwood Scholarships aggregate annual value £185. Twelve house surgeons and house physicians. Thirty-six resident pupilships, three months each, annually for senior students, of which a proportion is allotted to women students, special departments for radiology, clinical pathology, V.D., dermatology, gynæcology, vaccine therapy, electrocardiography, dentistry, radium therapy. Post-graduate lectures and demonstrations are given on Wednesdays throughout the year with the exception of holiday seasons.

Mater Infirmorum Hospital, Belfast

This hospital contains 270 beds and is open at all hours for the reception of accidents and urgent cases. Clinical instruction is given daily by Physicians and Surgeons. Surgical operations are performed daily. The out-patient departments in medicine and surgery, also the special dispensaries for gynæcology, ear, eye, and throat, electrotherapeutics, venereal diseases, varicose veins and hæmorrhoids are very largely attended and afford valuable opportunities to students for the study of those subjects. There is a well-equipped electro-medical and massage department. There is also a dental dispensary. A house physician and two house surgeons are elected every six months. Resident pupils are admitted as the vacancies arise. Three Exhibitions and a Gold Medal are competed for annually in June. Certificates of attendance upon this hospital are recognised by all the Universities and licensing bodies in the United Kingdom.

Belfast Hospital for Sick Children

At the hospital in Falls-road there are 73 beds, and clinical instruction is given. During the winter and summer sessions courses of lectures are delivered on the medical and surgical diseases incidental to infancy and childhood. Demonstrations in ophthalmology and pathology are given, and ample opportunities are afforded in the wards and in the out-patient department for gaining a practical and theoretical knowledge of the diseases of infancy and childhood. This hospital grants Certificates in Diseases of Children, which are recognised by the various examining bodies. Certificates are also granted for post-graduate study. A Gold Medal is offered for competition at the close of the session. A Davis Scholarship is awarded every two years for the best thesis on some branch of children's diseases.

Belfast Infirmary and Hospital

There are 1800 beds. Clinical courses are given quarterly, and a course for D.P.H. in hospital. An intern venereal clinic in infirmary is under the Corporation scheme. The maternity wards are recognised for practical midwifery training. The certificates of the vaccination class are recognised by the Local Government Board. There is a department for cancer with 32 beds, also X ray, bacteriological, and massage departments.

Royal Maternity Hospital, Belfast

This new building is in the grounds of the Royal Victoria Hospital and will supersede the maternity hospital in Townsend-street. It will be formally opened in October. There are 100 beds and an antenatal department catering for a large district. There is also an infant clinic and a department for venereal diseases and a separate septic block. The University obstetric tutor resides in the hospital and acts as senior resident medical officer. There are three house surgeons in addition, and resident accommodation for 15 resident students or post-graduates.

IRISH MEDICAL CORPORATIONS GRANTING DIPLOMAS

CONJOINT EXAMINING BOARD

The Conjoint Board of the Royal College of Physicians of Ireland and Royal College of Surgeons in Ireland requires of candidates the passage either of its own preliminary examination in the subjects of general education or proof that the candidate has passed one of the tests accepted by the General Medical Council as well as passing in the Pre-Registration Examinations in Chemistry and Physics and Biology.

Professional Examinations.—There are three professional examinations, the first of which cannot be completed earlier than the end of the second winter session, nor the final before the conclusion of full five years of medical study. Before being admitted to any of them the candidate must show that he has studied the different subjects in practice and theory for the requisite periods, certificates to this effect being accepted from the authorities of most of the recognised medical schools at home and abroad. The first examination consists of Part I. (*a*) Biology, (*b*) Applied Chemistry and Physics ; Part II., Anatomy and Physiology. The second examination deals with (*a*) Pathology, (*b*) Materia Medica, Pharmacy, and Therapeutics, (*c*) Forensic Medicine, Hygiene, and Public Health, (*d*) Ophthalmology, and may be taken separately.

Final Examination.—This is divided into three divisions, which cannot be completed until at least five years have passed in medical studies other than those for the Pre-Registration Examinations, and five years at least since the beginning of the curriculum. The divisions are (*a*) Medicine, including Fevers, Mental Diseases, and Diseases of Children ; (*b*) Surgery, including Operative Surgery ; (*c*) Midwifery, including Diseases of Women and Children, and the Practice of Vaccination.

Diploma in Psychological Medicine.—There are two examinations in connexion with this Diploma : Part I. consists of (*a*) Anatomy and Physiology of the Nervous System ; (*b*) Psychology. Part II. : (*a*) Neurology, including Clinical and Pathological Neurology ; (*b*) Psychological Medicine, including its legal relationships.

Further information can be obtained from the Secretary of the Committee of Management, Royal College of Surgeons, St. Stephen's Green.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

The College issues its Licences in Medicine and in Midwifery to practitioners whose names appear on the Medical Register of the United Kingdom.

The Licence in Medicine.—The subjects of examination are : Practice of Medicine, Clinical Medicine, Pathology, Medical Jurisprudence, Midwifery, Hygiene, and Therapeutics.

The Licence in Midwifery.—Candidates must produce certificates of registration. A registered medical practitioner of five years' standing may be exempted from the examination by printed questions.

The Membership.—Examinations for Membership are held in February, June, and November.

The Fellowship.—Fellows are elected by ballot. An applicant must have been a Member of the College for at least one year and must have attained the age of 27 years.

Further particulars can be obtained from the Registrar of the Royal College of Physicians of Ireland, 6, Kildare-street, Dublin.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The College issues its Licence in Surgery to practitioners whose names are entered either on the Medical Register for the United Kingdom, the Colonial Medical Register, or the Foreign Medical Register of the year in which he presents himself for examination, and who satisfies the Council that he has passed through a course of study and Examinations equivalent to those required by the Regulations of the Irish Conjoint Board.

Candidates are examined in General Surgery (paper and oral), Clinical Surgery, Surgical Pathology (oral), Operative Surgery, Surgical Anatomy (paper), and Ophthalmic and Aural Surgery (clinical).

Diploma in Midwifery.—A diploma in Midwifery is granted after examination to persons possessing a registrable qualification.

Fellowship Examinations.—Candidates for the Fellowship shall make application to the President and Council to be admitted to examination. They are required to pass two examinations—Primary and Final. Candidates may present themselves for the Final Examination immediately after passing the Primary part, provided they have complied with the necessary regulations. The subjects for the Primary Examination are (*a*) Anatomy, including Dissections ; and (*b*) Physiology and Histology. The subjects for the Final Examination are Surgery, including Surgical Anatomy and Pathology. For admission to the Final Examination the candidate must have passed the Primary Examination, and must be a Licentiate or Graduate in Surgery of a university or licensing body recognised by the General Medical Council ; all such candidates must not be less than 25 years of age.

Further particulars can be obtained from the Registrar of the College, Stephen's Green West, Dublin.

Schools of Surgery

The Schools of Surgery are attached by Charter to the Royal College of Surgeons and have existed as a department of the College for over a century. They are carried on within the College buildings and are specially subject to the supervision and control of the Council, who are empowered to appoint and remove the professors and to regulate the methods of teaching pursued. The buildings have been reconstructed, the capacity of the dissecting-room nearly trebled, and special pathological and bacteriological laboratories are fitted with the most approved appliances in order that students may have the advantage of the most modern methods of instruction. Winter Session commences in October ; Summer Session in April. Scholarships and Prizes : Carmichael Scholarship, £15 ; Mayne Scholarship, £8 ; Stoney Memorial gold medal ; Operative Surgery, gold and silver medals ; Barker Prize, £26 5s. ; H. Macnaughton-Jones gold medal in Obstetrics and Gynæcology ; and class prizes and medals. Prospectus and guide for medical students can be obtained post free on written application to the Registrar, Royal College of Surgeons, Stephen's Green W., Dublin.

APOTHECARIES' HALL OF IRELAND

The Licence of this Hall is granted to students who present certificates of having fully completed the course of study as laid down in the curriculum and who pass the necessary examinations. The diploma of the Hall entitles the holder to be registered as a practitioner in medicine, surgery, and midwifery, with also the privileges of the Apothecary's Licence.

Candidates must pass three Professional Examinations, called the First and Second Professional Examinations and the Final Examination, which are conducted at separate times, partly in writing and partly practically and orally. The Examinations are held thrice a year—viz., in March, June, and November, or such other dates as may be determined.

Candidates who produce satisfactory evidence of having passed an examination for a Degree or Licence in Medicine, conducted by any University or Royal

College in the British Empire, or by any Foreign University whose Degrees are recognised in the Foreign List of the Medical Register, will be exempted from the Primary Examination.

The subjects for the First Professional Examination are: Anatomy, Physiology and Histology, including Biochemistry; and for the Second Professional, Materia Medica and Pharmacy, Pathology, and Medical Jurisprudence and Hygiene.

For the Final Examination the subjects are: (*a*) Medicine and Clinical Medicine and Clinical Methods. (*b*) Surgery—Clinical, Ophthalmic, and Operative; and Surgical Anatomy. (*c*) Midwifery and Gynæcology, and Practical Pharmacy and Materia Medica (if not taken at Intermediate Examination).

Each candidate before receiving his diploma must produce evidence that he has attained the age of 21 years. The details of the course of education required and syllabus of the examinations will be supplied by the Registrar at 95, Merrion-square, Dublin.

WE take this opportunity of thanking the officials of Government Departments and the Deans and Secretaries of the various institutions for their kind coöperation in enabling us to bring the information contained in our Students' Number up to date.

This is the last issue of the Students' Number prepared with the collaboration of Mr. E. M. Ryder, who is now retiring from the staff of THE LANCET after 43 years of devoted service.

THE L.C.C. HOSPITAL SERVICE

THE hospital service of the London County Council provides opportunities for valuable experience for medical graduates who intend to be general practitioners or consultants, as well as for those who intend to make the public health service their career. Under the operation of the Local Government Act, 1929, the L.C.C. became responsible for the management of 74 hospitals (excluding mental hospitals)—namely, 28 general hospitals, 17 fever and other infectious diseases hospitals, 6 tuberculosis hospitals and sanatoria, 9 hospitals and convalescent homes for children, 12 hospitals and institutions for chronic sick patients, and 2 colonies for sane epileptics; 2 convalescent hospitals were subsequently acquired, making a total of 76.

Medical superintendents of the hospitals, who are expected to be experienced hospital administrators, receive £900 to £1650 a year, corresponding to hospitals varying in accommodation from 160 to 1390 patients. In addition, medical superintendents are provided with an unfurnished house or quarters, with payment by the Council of local and water rates. The subordinate staff is classified thus:

Grade.	Scale of annual salary.
Deputy Medical Superintendent, Grade I.	£650–£50–£800
Deputy Medical Superintendent, Grade II.	£600–£30–£750
Senior Assistant Medical Officer, Grade I.	£550–£25–£650
Senior Assistant Medical Officer, Grade II.	£500–£25–£600
Assistant Medical Officer, Grade I. ..	£350–£25–£425
Assistant Medical Officer, Grade II. ..	£250 (fixed)

In addition all these officers are provided with board, lodging, and washing, valued at £150 a year. All the positions mentioned involve full-time duties, and it is a condition of service that such officers shall not undertake any other paid employment. The staffing provides, where necessary, for house physicians or house surgeons, remunerated at the rate of £80 a year, with residence, and for clinical assistants, who are non-resident and receive £100, with meals when on duty. These officers are not employed in a whole-time capacity and are granted adequate leisure for study.

Vacancies in the higher grades are filled, as far as possible, by promotion from the existing staff. All full-time medical staff are allowed liberal annual leave with pay, and full pay during sickness for a reasonable period. For subordinate staff, the extent and fluidity of the hospital service provides unique opportunities for a variety of experience, and facilities exist for specialisation and for officers to follow courses of study outside the service with a view to improving their professional qualifications.

During the past year 113 vacancies have been filled, including 5 positions as medical superintendents, 1 as deputy medical superintendent, 8 as senior assistant medical officers, 67 as assistant medical officers, 31 as house surgeon, house physician, or clinical assistant, and 1 as medical officer of a children's hospital. During the year also a large number—more than 200—of part-time consultants have been appointed to the various units and groups of these hospitals. These appointments, which vary from 1 to 6 sessions a week, include physicians, surgeons, obstetricians and gynæcologists, anæsthetists, pædiatrists, neurologists, orthopædists, radiologists, dermatologists, ophthalmologists, urologists, and specialists in ear, nose, and throat.

In addition, other part-time consultants were appointed for special purposes—e.g., venereal diseases specialists, plastic and thoracic surgeons, &c.—and the services were made available of a tuberculosis officer at each general hospital having a tuberculosis ward.

Post-graduate facilities.—These are as follows:—

HAMMERSMITH HOSPITAL: In connexion with the British Post-Graduate Medical School, of which a full account is given on pp. 407 and 408.

PADDINGTON HOSPITAL: Post-graduate instruction in orthopædic surgery by clinical demonstrations, in collaboration with Fellowship of Medicine.

ST. ALFEGE'S HOSPITAL: Facilities are afforded to the Final Fellowship Class of Guy's Hospital to examine selected cases. The demonstration is undertaken by a surgical tutor of the class.

ST. ANDREW'S HOSPITAL: Consultant surgeon holds weekly classes for two periods of about 10 weeks previous to F.R.C.S. examinations.

ST. JAMES' HOSPITAL: The South-West London Post-Graduate Association has its headquarters at this hospital where three sessions of lectures are given annually—Christmas, Lent, and Summer. Usually 8 or 9 demonstrations are given per session. Instruction in orthopædic surgery is also given, in collaboration with the Fellowship of Medicine.

LAMBETH HOSPITAL: Post-graduate instruction is given in collaboration with the Fellowship of Medicine at fortnightly classes.

ST. PETER'S HOSPITAL: Post-graduate students from the London Hospital, who are reading for the final F.R.C.S. examination, attend to receive clinical instruction by the consulting surgeon.

Post-graduate courses.—Courses of instruction in hospital administration for candidates for the Diploma in Public Health are held at the NORTH-WESTERN HOSPITAL and at the BROOK HOSPITAL.

Under-graduate facilities.—Certain hospitals are affiliated to medical schools for the purpose of clinical teaching and, in addition, under-graduates are accepted as resident students for experience in obstetrics. The fever hospitals provide facilities for under-graduate instruction in infectious disease.

Small-pox.—Provision is also made for demonstrations in the diagnosis and treatment of small-pox for both under-graduate and post-graduate students.

Special Units.—Special departments in general hospitals are available—namely, at ST. JAMES' HOSPITAL for the treatment of cases by plastic surgery; at LAMBETH HOSPITAL for the treatment of patients by radium therapy; at NEW END HOSPITAL for the treatment of patients suffering from thyroid disease; and at ST. STEPHEN'S HOSPITAL for rheumatic cases.

THE LANCET

LONDON: SATURDAY, AUGUST 25, 1934

THE MEDICAL CURRICULUM

AN annual summary of the educational courses offered by the various universities, colleges, and societies to students intending to obtain a medical degree or diploma will, as it is published each year, resemble very much in form its immediate predecessors; but on almost every page in the issue of 1934 new information is afforded in order to bring the record up to date; and the additions point in two directions, both of which are creditable to medicine while each is embarrassing to those who supervise the training for the profession. For while on every side we can witness the far-ranging activity that prevails at all the educational centres, simultaneously we have evidence of the opportunities afforded for the acquisition of special knowledge along important lines. Hence the ancient problem is accentuated of what should be demanded from students, having regard to the public duties and responsibilities so soon to be assumed by them, as most essential for their equipment. Extension of the period of training, so that it may go hand in hand with the progress—the multiplying progress—of medicine, its ancillary sciences and dependent branches, seems impossible, and yet efforts to that end must not be sacrificed to expediency. But there are practical reasons why some defining line should be drawn as to what can be expected from the student. While he cannot reach registration with a full range of academic knowledge at his fingers' ends at the outset—an impossibility that is not apparent to many public critics of medical service—neither can he have the experience to be obtained from actual contact with the scientific, professional, and public questions which he will have to encounter. A student to be thus armed would remain in leading strings all his life; yet the limitations imposed already on the duration of his training call for the reflexion that time and money have value; they mean much to the student as well as to those upon whom he is dependent in many cases for his support until he can establish a livelihood.

THE IMPORTANCE OF THE START

The difficulty of the task before those who are attempting to shape the curriculum so that the student following it with success may feel ready to face the future with confidence is thus indicated. There is, as far as accurate definition can go, no limit to what it might be serviceable for him to learn, but a period is imposed primarily by the State and secondarily by material considerations in the time that *should* be occupied by his studies. The curriculum is now under much scrutiny, and the General Medical Council is prepared to begin at the beginning. At the summer session last year Sir NORMAN WALKER, in a presidential address, reminded the Council that the body was primarily concerned with maintaining a minimum qualification for admission to the Register, and that each licensing body is its own master in the matter of further requirements. And he continued with a significant reference to previous pronouncements by the Council upon preliminary education, to the effect that the training of the student destined for medicine ought not to differ from that of candidates for other professions. How true is the adage that the more things change the more they remain the same! For that is what the Council thought and said some 70 years ago. Sir NORMAN WALKER went on to say that those who are entrusted with an advisory voice in the education of medical students must press for the very thorough grounding of the student in certain preliminary subjects, and the Council will do great service if opinions from it, as the controlling body, are expressed in this direction. For the point up to which study previous to registration should be carried is not sufficiently uniform in the different licensing quarters, probably because registration at the commencement of the curriculum, most unfortunately, has not been made compulsory. It is right that all the licensing bodies should have their own say in the guarding of their portals, but it must be insisted that the preparation of candidates for professional training will bear fruit throughout the whole educational course, and that low grading beforehand will bring retribution. Professional learning has from its start a significance for the properly prepared student which it cannot have for one who is compelled to work without comprehension of basic facts. This is he who too often finds the tests imposed upon him by a series of examiners particularly burdensome, and his unfamiliarity with groundwork leads both to his individual disappointment and to clamant criticism of the system of examination.

THE WIDE INTEREST IN THE CURRICULUM

All this has formed the subject of close or desultory discussion for many years; but now the interest aroused is more intense than it ever has been, while the intention to arrive at a solution of the main question—What should the medical curriculum include?—shows the character of inquiries which are now taking place. The General Medical Council, the British Medical Association, the Board of Education, and the authorities at the universities and medical schools have shown noticeably during the last two years their awareness of the need for reviewing the curriculum, knowing well the difficulties attendant. But these difficulties have received such frequent notice, not always of a reasonable character, that an undue impression has been created of the seriousness of the situation. The opinions of those who find the whole medical training afforded in our schools to represent a hopeless muddle are seen to be unjustified when we weigh such evidence as is to be found in the present pages as to the structural soundness of the general scheme, and observe the numerous places in which reforms are being or have been quietly made, conducing to simplicity and economy. At the present moment the General Medical Council is planning a revision of the curriculum from its position as the standardising authority. Discussions on the various points, as well as statements from the presidential chair, have shown the attitude of the Council to be wise as well as correct; preserving its right of control and supervision, it makes no attempt to interfere with the autonomy of the qualifying bodies in arranging their own patterns of training. But it welcomes assistance from without, such as for example will come from the deliberations and conclusions of the important committee now sitting, at the instance of the faculty of medicine of the University of London. This committee has the possible revision of the whole curriculum as its object, and the Universities of Oxford and Cambridge, the English Colleges, and the Society of Apothecaries have sent representatives to a conference with the University of London. They have not yet reported, but we can be certain that their terms of reference will give them an opportunity of debating the method in which all the subjects are dealt with by the teachers and by examiners; and from such a body we may specially look for a lead as to the respective parts which academic and practical training should play in fitting the newly qualified man for his immediate future.

The report of the Committee on Medical Education of the British Medical Association must be of the first assistance to the G.M.C., and will form a text upon which much action should be taken by the Council. This valuable document at the outset is in flat opposition to querulous condemnation of the existing course of medical education as a whole. It starts with pointing out the value of general education and suggests that the course of study in the usual school subjects, and in chemistry, physics, and biology, should not be shaped for medical students only. All will agree that early segregation of the medical student is wrong, and the two years of training before registration should be spent by the medical student in general training as his contemporaries spend them who intend to enter one of the other professions. The examinations which he will have to pass before registration should be flexible, and with whatever certificate the student emerges he should have obtained scientific knowledge which is fundamental and not utilitarian. As will be seen by consultation of the first pages of this issue, the admission of students at the Universities of Great Britain and Ireland proposing to take a degree in any faculty is fairly uniform, even though a comparison of the different university regulations discloses minor divergencies in application. Of the medical student, it must be remembered that he may not intend to seek a university degree, but his admission to registration is guarded by the diploma-granting bodies in a similar manner. So that while certain of the formalities of university matriculation for the medical student seeking a diploma from one of the licensing colleges or societies may be absent, the test of his fitness to start on a medical course remains practically the same. The qualifications for admission to the universities of Great Britain and Ireland are regulated by school examinations, and the certificates obtained at these examinations provide the proof of the student's suitability for his proposed career, previous to recognition by the General Medical Council as a registered student. It is an anomaly, already mentioned, that such registration is not compulsory, for it is clear that the student, before embarking upon medical study proper, should have acquired such an introduction to the principles of chemistry, physics, and biology as to enable him to begin his specialised work with appreciation of its significance, and without the drawback of fundamental general ignorance, which has to be removed after entrance upon clinical education.

THE REPORT OF THE EDUCATION COMMITTEE OF THE B.M.A.

Even a cursory consideration of the formalities which guard the entrance of the student into the medical profession will dispel the idea that it is easy for the ignoramus to start on his professional career; the Report of the B.M.A. is definite on the point. When we turn to the section of the Report dealing with the first two years of professional training proper, we find five terms allotted to the study of anatomy and physiology and one term to the study of pharmacology, and of the introductory phases of general pathology exemplified by elementary bacteriology. On this period of the curriculum the Report makes thoroughly shrewd recommendations devised to save time for the acquisition of the important by the suppression of instruction in matters where it is not so much needed. All will agree that much of the details of anatomy and of what may be termed repetitional physiology form unnecessary baggage. The traveller's pack will not be the lighter for his being relieved of them, but he will be enabled to carry things more necessary for his arduous journey. During these two years the student should be able to obtain knowledge of the principles of asepsis and antisepsis, when the reasons for his introduction to bacteriology will become plain to him; at the same time some familiarity with work in the post-mortem room will prepare him for the clinical instruction which lies ahead. In this way the work of the first two years will provide a liaison course between the study of normal structure and function and that of deviations from them. The Report says little concerning teaching in the wards, class-rooms, and laboratories of medicine, surgery, obstetrics and gynæcology as at present conducted, and thus affords proof of the essentially good clinical teaching of the British schools; the brevity of the Report at this point is an eloquent answer to much carping. More stress it is suggested might be laid, at any rate in certain centres of education, on the conduct of minor operations and on the facilities afforded for familiarity with more serious conditions, and there may be some surprise that the standard of obstetric work comes off without directly adverse comment. But it will be remembered that last year detailed proposals for stiffening this side were made by the G.M.C. These proposals are adopted by the B.M.A. Report, while the absence of regular teaching in a general way of the subjects of postnatal and antenatal care of the mother, and of child welfare is noted. Such extension of the training is admitted universally to be necessary and would form a direct introduction for the student to the humane and social sides of his future calling. Similar advantages will be obtained for him if the proposals of the Report can receive effect that time should be found for the study of physico-therapy and psychotherapeutics. Such additional matter might form the subject of direct instruction in accordance with a time chart, but the instruction will be far more vivid if it is obtained in the course of other and more general teaching; the student is thus at each phase made aware that, though he will be dealing with material of very varied make up, there exist general principles and laws of wide application to assist him. For he should be taught to look at the patient as one whose particular troubles will always be influenced by his general physical capacity, by his mentality, and by the influence which his environment must have in all directions.

A DRASTIC PROPOSAL

So far the considerations of the Report of the Education Committee of the B.M.A. should receive acceptance by all, but the closing recommendation is sure to be challenged, and it is the most drastic of all. It is said that the present curriculum, but with less specialisation, should close with a final written and oral examination, but that the student should not be eligible to obtain his legal qualification without a further period of nine months of practical experience to be gained in one of five ways: (1) in a resident appointment in any approved hospital; (2) as clinical assistant in a hospital or clinic; (3) as pupil assistant to an approved general practitioner; (4) as pupil to an approved M.O.H.; (5) in regular attendance at hospital practice in a medical school. The first impression made by the proposal is that it is admirable, while the second is that to put it into effect would be accompanied with practical difficulty. Will the student find time to meet successfully his final examinations at the proper date and yet have nine months free to acquire the further clinical experience? As a resident at a hospital his procedure would be clear, and the inconvenience to the hospital authorities of employing unregistered internes could easily be got over. Here the proof that his time had been employed in the manner designed by the scheme would be forthcoming easily. But as the pupil of the M.O.H. or the approved general practitioner the evidence of an employment of his time in accordance with the intention of the scheme would be difficult to come by, if only because in each case the duties set before the pupil for discharge might not lend themselves easily to definition. Clearly the proposal to introduce what is a form of post-graduate activity into the under-graduate period is a highly important one, and the perplexities in giving effect to it must not be exaggerated; on the contrary, it is to be hoped that it will obtain the close attention that it merits and that no one will come to a hasty conclusion concerning it. A procedure is here formulated which would enable the young general practitioner to enter upon his calling more fitted to do public service, and that was the prime object that the Education Committee of the B.M.A. had before them. The proposal is fundamental in its significance.

THE SCHEME IS SOUND

Two years ago a group of writers in a position to speak with authority on the subject replied in these columns to the sweeping question—What is wrong with the medical curriculum? and suggestions were forthcoming which in many directions tally with the B.M.A. Report. Taken as a whole these articles, like the B.M.A. Report, found little or no fault with the clinical part of the existing curriculum, but pointed rather to directions in which opportunities must in the future be given for the students to acquire fundamental knowledge on subjects as yet relegated to the post-graduate period. While the possibility was indicated in several directions, in accordance with the bent of the individual writers, where rearrangements for specialisation might be made during under-graduate training, the recommendations in the main concerned the providing of proper equipment for men entering general practice. These form the largest as well as the most important section of the profession, and on them falls from the outset a trial of their ability in responsible situations. The immediacy with which the young practitioner has to face the burden of practice creates the essential difficulty in fitting his training to his needs. He who desires to specialise in a particular branch of medicine, or to join a particular medical service, will undergo post-graduate training as a matter of routine; he will not be called upon to discharge duties in circumstances which he has not been trained to meet, and his duties will be circumscribed. But the practitioner, without being in an exact sense neurologist, pathologist, or sanitarian, must have knowledge upon which he can draw to guide his conduct, when questions coming under any of these and other important headings arise in the course of his daily work. To bring this about the training before entrance to the profession requires to be improved so that the professional knowledge shall be firmly based and more easy of acquisition. And throughout the curriculum opportunities for learning under supervision how to apply practically the clinical wisdom which he is gaining need to be more freely afforded. These two things would seem to be wanted. And though they can be stated thus succinctly, the bringing of them about is taxing the ingenuity of many whose devotion to the subject is well known. But the deep interest in the training of the student, now being manifested, must bring about real results, while it is good to feel that existing pessimism is ill-grounded.

THE MEDICAL SERVICES

NAVAL MEDICAL SERVICE

THE revised regulations and conditions of service arising out of the Warren Fisher Committee report have recently been published by the Admiralty, and it is considered that the Naval Medical Service now offers to well-qualified medical men a very satisfactory career, with excellent opportunities for the practice of their profession and for specialisation in many subjects; the pay is good, and so is the prospect of promotion to the higher ranks with an adequate pension on retirement.

The following information embodies the principal changes in conditions.

Entries will be on a Short Service basis, and will be for an initial period of 3 years, to be extended to 5 years at the discretion of the Admiralty.

Officers leaving the service at the end of 3 years will be eligible for a gratuity of £400, whilst those who leave at the end of 5 years will receive £1000.

Officers may be transferred to the Permanent List at the discretion of the Admiralty on completion of 5 years' Short Service. A gratuity of £1000 will be paid, but the Officer will be required to render a minimum of 25 years' service in order to qualify for full pension, including seniority granted, if any, in respect of Civil Hospital time. With regard to the latter, antedate of Seniority of not more than one year may be allowed in respect of resident appointments in Civil Hospitals held prior to entry to the R.N. Medical Service. The antedate will count for seniority and eligibility for increase of pay, and if the officer is transferred to the permanent list it will count also as service for the purposes of promotion and retired pay, or gratuity on retirement.

Opportunities will be afforded for officers to specialise during the course of their career, and the number of Specialists posts carrying additional emoluments has been increased from 60 to 83.

The age of retirement has been increased in the case of Surgeon Commanders from 50 to 55, and in the case of Surgeon Captains from 55 to 57, thus affording officers the prospect of a longer career on full pay.

Candidates must not be above the age of 28 years.

MEDALS AND PRIZES

Gilbert Blane Medal.—This Medal is awarded annually to the Surgeon Lieutenant-Commander who obtains the highest aggregate marks at the examination for promotion to the rank of Surgeon Commander. The award is subject to the approval of the Presidents of the Royal College of Physicians and Surgeons respectively and the Medical Director-General of the Navy.

Other awards and prizes open to Naval Medical Officers are the Chadwick Naval Prize, the North Persian Forces Memorial Medal, and the Parkes Memorial Prize.

PAY AND ALLOWANCES

Full Pay (Current Rates)

		£		£	
SURGEON LIEUTENANT (short service and permanent service)	from	434	to	477	per annum.
SURGEON LIEUTENANT-COMMANDER (promoted after six years' service)	,,	574	,,	608	,,
SURGEON COMMANDER (promoted after a further six years' service)	,,	739	,,	1052	,,
SURGEON CAPTAIN (promoted by selection)	,,	1067	,,	1314	,,
SURGEON REAR-ADMIRAL (promoted by selection)		1724			,,
MEDICAL DIRECTOR-GENERAL..		2185			,,

Allowances

An outfit allowance of £50 towards cost of uniform is given.

Allowances when in charge of hospitals and sick quarters ..	10*s.* and 5*s.* per diem.
Eighty-three Specialist allowances of	5*s.* per diem.
Allowances to Senior Medical Officers in flagships	5*s.* and 2*s.* 6*d.* per diem.

Accelerated promotion can be gained under certain conditions: provision allowance and lodging allowance are paid when victualling and accommodation are not provided. Servant's allowance is also payable in certain appointments.

The extra allowances alluded to in this Table are not to be looked upon as very exceptional. About a quarter of the Medical Officers of the Navy are drawing extra allowances.

PENSION

Naval Officers retire at certain ages according to the rank they have attained. Except for those promoted to the 40 higher posts, the usual retiring age is 55 as Surgeon Commander, the appropriate pension according to scale being £540 per annum.

The current scale of pensions is as follows:—

	Maximum retired pay.		
SURGEON VICE-ADMIRAL ..	£1076 per annum on vacating office.		
SURGEON REAR-ADMIRAL ..	£909 per annum at age of		60.
SURGEON CAPTAIN	£810	,, ,,	57.
SURGEON COMMANDER	£540	,, ,,	55.
SURGEON LIEUTENANT-COMMANDER AND SURGEON LIEUTENANT	£405	,, ,,	45.

Officers permitted to withdraw receive gratuities on the following scale:—

	£
Over 10 and under 15 years' service ..	500
,, 15 ,, ,, 18 ,, ,, ..	1800
,, 18 years' service	2700

The old regulation by which officers were admitted direct to the Permanent Service by examination is now abolished. No examination for entry is held, but candidates will be required to present themselves before a Selection Board at the Admiralty presided over by the Medical Director-General of the Navy, to whom application should be made for further details.

Dental Branch

Candidates, who must be qualified dental surgeons and below the age of 28 years, are required to produce certificates of birth, registration, and of character, and must be physically fit for active service anywhere. An outfit allowance of £50 is payable to officers finally entered and commissioned. The rank of Surgeon Lieutenant-Commander (D) is attained on the completion of six years' satisfactory service. Promotions to Surgeon Commander (D) and Surgeon Captain (D) are made strictly by selection from the rank next below and are confined to officers who prove fitted in every respect for these ranks. The present establishment of dental officers is: 1 Surgeon Captain (D), 3 Surgeon Commanders (D), 60 Surgeon Lieutenant-Commanders (D) and Surgeon Lieutenants (D).

Provision has been made for candidates who have held, or who, at the time of passing the examination hold or are about to hold, an appointment as Dental Officer in a recognised Civil Hospital. The time concerned, provided it does not exceed six months, may reckon for increase of full pay while on the active list.

On the completion of two years' service in the rank of Surgeon Lieutenant-Commander (D), dental officers on the Active List are eligible for a three months' post-graduate course at a dental hospital and school at the public expense, and will draw full pay while attending the course.

Pay.—The current rates of full pay for Dental Officers are as follows :—

	£ £
Surgeon Lieutenant (D)	362–444
Surgeon Lieutenant-Commander (D) (promoted after six years' service)	535–657
Surgeon Commander (D) (promoted by selection to fill vacancies in Establishment)	699–894
Surgeon Captain (D) (promoted by selection to fill vacancy in Establishment)	1028–1275

The Regulations regarding Pension and Withdrawal Gratuities are the same as for Medical Officers in the corresponding Ranks.

In 1919, when new rates of pay for all Naval Officers were fixed, it was decided that 20 per cent. of these rates should be considered as due to the then high cost of living. The rates of pay shown above are those payable on and after July 1st, 1934, and represent a reduction owing to the decrease in the cost of living. The 20 per cent. above mentioned is to be regarded as variable and subject to change at six-monthly intervals, either upwards or downwards according as the cost of living rises or falls.

ARMY MEDICAL SERVICE

Royal Army Medical Corps

THE appointment of officers to the Royal Army Medical Corps will, in the first instance, be by means of a Short Service Commission for a period of five years. In the fifth year of service an officer will be given the choice of retiring with a gratuity of £1000 or of applying for a permanent commission. Those retiring with a gratuity after five years' service will be liable to be called up for duty in the event of a national emergency arising during the twelve years following their retirement.

New entrants are commissioned in the rank of Lieutenant, and the first three months of their service are on probation, during which time they undergo a course at the Royal Army Medical College in London, in Hygiene, Tropical Medicine, Entomology, &c., &c., in addition to their military training at the Royal Army Medical Corps Depôt at Aldershot. A grant of £50 is made for the purchase of uniform.

An entrant who is holding or who is about to hold at the time of entrance an approved whole-time appointment at a recognised Civil Hospital may be seconded while holding such appointment up to a maximum period of 12 months. A candidate who has held such an appointment within six months of entry may be granted an antedate up to 12 months in respect of the period the appointment was held. The period of secondment or antedate will not reckon in diminution of the period of five years which he is required to serve on a short service commission, but on completing one year of actual service in the R.A.M.C. the period of secondment or antedate will count for seniority.

If appointed to a permanent commission the period of secondment or antedate will count as service for promotion to the rank of Major, increases of pay in the ranks of Captain and Major, and retirement on retired pay or with gratuity.

PROMOTION

Promotion to Captain will be after one year's commissioned service on full pay. If appointed to a permanent commission promotion to the rank of Major will be on completion of 10 years' commissioned service. Promotion to the ranks of Lieutenant-Colonel and Colonel will be by selection to fill vacancies within the establishment which is designed to allow promotion to those ranks on the average after 17 and 25 years' service respectively.

PROFESSIONAL OPPORTUNITY

The possibilities for good work are very great. There is scope for original research in tropical diseases, in preventive medicine, and in bacteriology, as well as in the large clinical field open to the specialist in Medicine, Surgery, Gynæcology, Diseases of the Ear, Nose, and Throat, Ophthalmology, and Venereal Diseases. Child Welfare is also undertaken systematically by officers of the R.A.M.C.

FOREIGN SERVICE

The tour of foreign service in India or the Mediterranean Stations is five years, that of the Colonies three years, but in the case of those officers retiring on a gratuity after five years' service, arrangements would be made for them to return to England at public expense by the end of that period.

TABLE SHOWING PAY AND ALLOWANCES (HOME RATES)

Appointment.	Pay.*	Rations †	Servant.	Married.‡			Unmarried.		Approximate total per annum.	
				Lodging.	Fuel and light (average)	Furniture allowance	Lodging.	Fuel and light (average)	Married.	* Unmarried.
	A day. £ s. d.	A day. s. d.	A day. s. d.	A day. s. d.	A day. s. d.	A day. s. d.	A day. s. d.	A day. s. d.	£	£
Lieutenant	0 19 10	1 3	2 0	3 6	1 7	2 0	2 6	0 8	552	481
Captain	1 4 4	1 3	2 0	4 6	2 8	2 0	2 6	0 8	672	563
After 6 years' service ..	1 7 0	1 3	2 0	4 6	2 8	2 0	2 6	0 8	721	611
„ 8 „ „ ..	1 9 4	1 3	2 0	4 6	2 8	2 0	2 6	0 8	763	654
Major	1 13 10	1 3	2 0	4 6	2 10	2 0	4 0	1 3	849	774
After 13 years' service ..	1 18 4	1 3	2 0	4 6	2 10	2 0	4 0	1 3	931	856
„ 16 „ „ ..	2 0 6	1 3	2 0	4 6	2 10	2 0	4 0	1 3	970	896
„ 18 „ „ ..	2 5 0	1 3	2 0	4 6	2 10	2 0	4 0	1 3	1052	978
Lieutenant-Colonel	2 11 10	1 3	2 0	4 6	3 0	2 0	4 6	2 4	1180	1131
After 3 years' service as such	2 16 4	1 3	2 0	4 6	3 0	2 0	4 6	2 4	1262	1214
Colonel	3 3 0	1 3	2 0	5 6	3 11	2 0	5 6	2 8	1419	1360
Major-General	4 5 6	1 3	4 0	11 0	4 10	2 0	11 0	3 10	1983	1928
Director-General	5 10 4	1 3	6 0	13 9	5 5	2 0	13 9	4 5	2410	2356

* The rates of pay shown in the above Table are the rates issuable with effect from July 1st, 1934, and represent the standard rates as laid down in the Pay Warrant, 1931, less a deduction of 10 per cent. on account of the fall in the cost of living since 1919. In the case of the Director-General the rate of pay shown is the standard rate less a deduction of 8 per cent., but a special deduction of 5 per cent. has been made from the total of his pay and allowances.

† These rates apply when rations cannot be issued in kind.

‡ A married officer for the purposes of furniture, lodging, fuel, and light allowances is one who is or has been married and is 30 years of age or over.

POST-GRADUATE STUDY

A permanent commissioned officer will, between his sixth and tenth year of service, undergo a course of post-graduate study at the Royal Army Medical College and the London hospitals of five months' duration, followed by a course of study of a special subject selected by himself, provided he has shown special aptitude in the post-graduate course or during his previous service. During this course of study he remains on full pay, and the fees for the course are paid by the State.

When qualified in his special subject, the officer up to and including the rank of Lieutenant-Colonel becomes entitled to specialist pay at 4*s.* 6*d.* per day when holding a specialist appointment.

PAY AND ALLOWANCES (HOME RATES)

The rates of pay and allowances for officers are at present as shown in the Table, but the allowance rates vary slightly from time to time. In addition, specialist pay and charge pay are given under certain conditions as noted below.

ADDITIONAL PAY

An officer below the substantive rank of Colonel holding an appointment as specialist receives 4*s.* 6*d.* a day, in addition to his ordinary pay.

The Adjutant, R.A.M.C. Depôt, receives 5*s.* a day in addition to his ordinary pay.

CHARGE PAY	Daily. *s.*	*d.*
(*a*) An officer below the substantive rank of Colonel in charge of a hospital of 50 beds and over, or in charge of a medical or surgical division of a general hospital with at least 300 beds	5	0
(*b*) Senior Medical Officer, Royal Arsenal ..	5	0

Assistant Professors at the Royal Army Medical College (Lieutenant-Colonels) receive pay and allowances of their rank plus £89 a year.

GRATUITY; SHORT SERVICE OFFICERS

The gratuity of £1000 granted on retirement, after five years' service as a medical officer, to a short service officer who does not obtain a permanent commission is generous, and should go a long way to enable an officer on leaving the Service towards establishing himself in Civil life.

Entry takes place twice yearly at the beginning of May and November.

Regulations for admission, giving full details and application forms, should be obtained from the Assistant Director-General, Army Medical Services (A.M.D.1), The War Office, Whitehall, London, S.W.1.

RETIREMENT AND RETIRED PAY: OFFICERS HOLDING PERMANENT COMMISSIONS

The following are the rates of retired pay:—

1. Retired pay consists of two parts: (*a*) a service element based on the officer's total service; (*b*) a rank element for the rank from which the officer retires. An officer with less than 20 complete years' service will not be eligible to retire voluntarily on service retired pay.

2. The scale will be as follows, subject to the reduction of 10 per cent. referred to below:—

(*a*) Service element.—£15 a year for each completed year of service as a medical officer.

(*b*) Rank element.—

Rank from which retired.	After completing 1 year's service in the rank.	After completing each additional year's service.	Maximum rank element.
	£	£	£
Major	12	12	120
Lieutenant-Colonel	150	30	240
Colonel	290	50	390
Major-General ..	440	50	540
Lieutenant-General	590	50	690

The retired pay of an officer retiring with less than one complete year's service in the rank from which he retires will be assessed as though he had retired from the rank below.

Maximum rates of retired pay (*a*) and (*b*) together:—

	£		£
Major	450	Major-General ..	1000
Lieutenant-Colonel ..	600	Lieutenant-General ..	1200
Colonel	800		

The above rates are those laid down in the Pay Warrant. They have been reduced by 10 per cent. as from July 1st, 1934, and are subject to further revisions.

3. Officers may be permitted to retire with a gratuity in accordance with the following scale:—

With less than 10 years' service as a medical officer	£1000
After 10 years' service as a medical officer ..	£1500
,, 15 ,, ,, ,, ,, ..	£2800
,, 18 ,, ,, ,, ,, ..	£3500

The Army Dental Corps

This Corps is administered by the Director-General, Army Medical Services. Regulations for admission to The Army Dental Corps should be obtained from the Under Secretary of State, War Office, and carefully studied.

OFFICERS: APPOINTMENT AND PROMOTION

1. Commissions as Lieutenants in The Army Dental Corps may be given to persons duly qualified under regulations approved by the Army Council.

2. An officer who is commissioned after holding an approved whole-time appointment in a recognised civil dental hospital or in the dental department of a recognised civil general hospital may be granted an antedate covering the period of his appointment, but not exceeding six months, provided that the interval between the termination of the hospital appointment and the date of entry into the Service does not ordinarily exceed six months. The period of such antedate will reckon towards promotion, increase of pay, gratuity, or retired pay.

3. An officer is eligible for promotion to the rank of Captain on completion of three and a half years' service and to the rank of Major on completion of 12 years' service in the Corps, provided he has previously qualified in such manner as may be prescribed by the Army Council.

4. Promotion to the rank of Lieutenant-Colonel and Colonel to fill the establishments laid down from time to time for those ranks is made by selection from those senior in the rank below. Dental officers are also eligible for special promotion by brevet.

PAY

The following are the rates of pay for officers of The Army Dental Corps.

	Per diem. £	*s.*	*d.*
Lieutenant		18	0
Captain	1	2	6
Captain after 8 years' total service ..	1	5	2
Captain ,, 10 ,, ,, ,, ..	1	7	0
Major	1	11	6
Major, after 15 years' total service	1	16	0
,, ,, 18 ,, ,, ,, ...	1	18	4
,, ,, 20 ,, ,, ,, ...	2	2	10
Lieutenant-Colonel	2	9	6
Lieutenant-Colonel after 3 years' service as such	2	14	0
Colonel	3	0	10

CHARGE PAY

The officer in charge of the Dental Laboratories, Aldershot, receives charge pay at the rate of 5*s.* a day if holding the rank of Captain, or 2*s.* 6*d.* a day if holding the rank of Major.

ALLOWANCES

The allowances for officers of The Army Dental Corps are at the same rates as for officers of the Royal Army Medical Corps.

RETIREMENT AND RETIRED PAY OR GRATUITY

(1) The rates of retired pay will be the same as for officers of the Royal Army Medical Corps.

(2) Voluntary retirement on retired pay will not be allowed until after 20 years' service.

(3) Earlier retirement on gratuity may be allowed:—

After 8½ years' } service as a Dental { gratuity of £1000.
" 15 " } Officer, { " £2000.
" 18 " } { " £3000.

The aim of the Corps is the prevention of wastage on account of dental disease or dental deficiency, and, to enable this to be carried out, every recruit is inspected by a dental officer immediately after joining and all necessary treatment carried out. The soldier is reinspected at least once a year and the dental efficiency maintained at the best standard possible.

INDIAN MEDICAL SERVICE

THIS Service shares in the general conditions of change to which the whole of Indian State and civil affairs are at the present being subjected. While it is the view of many senior officers that the period of depression is passing, the grounds on which this view is held would be challenged by many. The Service is, in fact, obtaining excellent recruits, of whom the Director-General remarked not long ago that they were to be envied in embarking on a great adventure in which the part played by the Service would be greater than it had ever been in the past. The India Office is now inviting applications for permanent commissions on very favourable terms to young members of the medical profession. These terms include a gratuity of £1000 on retirement after six years' service, or one of £2500 after 12 years' service, together with free return passages for those who no longer desire to remain in the Service. An announcement made by the India Office admits frankly that it is not possible to state at present what, if any, prospects of employment on the civil side will be open to I.M.S. officers under the proposed new constitution. We find it difficult to imagine the abolition of the civil side of the Service, having regard to past magnificent work and present urgent needs.

THE NEW REGULATIONS

Competitive examination remains suspended for the present and admission to the Service is on written application to the India Office. As sound bodily health is a first essential candidates may, if they wish it, undergo a preliminary examination by a Medical Board which meets weekly at the India Office.

Candidates must be under 32 years of age at the time of application, and must possess a qualification registered in Great Britain and Northern Ireland, under the Medical Acts in force at the time of appointment. Arising out of the recommendations of the Lee Commission the Secretary of State for India in Council after consultation with the Government of India has decided that the Indian Medical Service constituted on the same broad lines as in the past shall be retained primarily to meet the needs of the Indian Army. In order to maintain the necessary minimum war reserve of military medical officers, and to provide for European medical attendance for European officers of the Superior Civil Services and their families, local governments will be required to employ a stated number of Indian Medical Service officers. The Government of India will draw on the same Service to meet the requirements of the civil administration for which they are responsible. For the present 237 such posts have been reserved, and including the leave reserve will provide employment for 302 officers; 212 of these officers will be British medical men and 90 Indians. As the proportion of European to Indian civil officers diminishes these figures will be subject to periodical scrutiny, and, if necessary, to revision. It will be a definite condition of service for all future entrants to the Service that they will be liable to serve on either the civil or the military side. All officers are required to perform one year's military duty subsequent to permanent appointment before they can be considered eligible for civil employment. Executive medical officers in both civil and military employment may attend persons unconnected with Government service provided their duty admits of it. On the military side, however, the opportunities for private practice are not great. The commissions of officers who before appointment have obtained certain higher qualifications or have held resident appointments in certain hospitals may be antedated by one year.

RATES OF PAY

The monthly rates of pay for European officers of non-Asiatic domicile in the Service are as tabulated below. The rupee, it may be remembered, has now been definitely stabilised at 1s. 6*d*.

Rank and service in rank.	Basic pay.	Overseas pay.	Year of total service.
	Rs.	Rs.	
Lieut.	500	150	First
Captain:—			
1. During first three years' service as Captain.	650	150	Second
		150	Third
		150	Fourth
2. With more than three and less than six years' service as Captain.	750	£15	Fifth
		£15	Sixth
		£25	Seventh
3. With more than six years' service as Captain.	850	£25	Eighth
		£25	Ninth
		£25	Tenth
		£25	Eleventh
		£30	Twelfth
Major:—			
1. During first three years' service as Major	950	£30	Thirteenth and over
2. With more than three and less than six years' service as Major	1100		
3. With more than six years' service as Major	1250		
Lieut.-Colonel:—			
1. Until completion of 23 years' total service	1500		
2. During twenty-fourth and twenty-fifth years' total service	1600		
3. After completion of 25 years' total service	1700		
4. When selected for increased pay ..	1850		

NOTE TO TABLE

Until the completion of 23 years' total service basic pay is regulated according to rank and service in rank (column 1) which, owing to the system of accelerated promotion, may be in advance of the time-scale of promotion. Overseas pay is regulated solely with reference to length of total service (column 4). In addition to the above rates various allowances are admissible for a large number of special appointments on both the military and the civil side which may be held by members of the I.M.S. Special high rates of pay are also attached to the numerous administrative appointments open to officers in both branches of the Service. The appointment of Director-General, I.M.S., which is held by an I.M.S. officer, carries pay of Rs.3500 per mensem. The appointment of Director of Medical Services in India, carrying pay at Rs.3200 per mensem, may also be held by an officer of the Indian Medical Service.

Owing to the state of financial emergency prevailing in India, the existing monthly rates of pay and allowances are at present subject to a temporary reduction of 5 per cent.

Officers on arrival in India will be posted for one year to specially selected stations. Officers in military employment, when in command or second-in-command of the larger station hospitals, receive special allowances. On the civil side there are public health, bacteriological, research, and professorial appointments carrying special enhanced rates. Officers on appointment receive an outfit allowance of £50.

PENSIONS AND ALLOWANCES

The rates of pensions are as shown in the Table below.

Service.	Rates per annum.	Service.	Rates per annum.
After 17 years ..	£400	After 23 years ..	£620
„ 18 „ ..	430	„ 24 „ ..	660
„ 19 „ ..	460	„ 25 „ ..	700
„ 20 „ ..	500	„ 26 „ ..	750
„ 21 „ ..	540	„ 27 „ ..	800
„ 22 „ ..	580		

The above rates are subject to periodical revision upwards or downwards, to an extent not exceeding 20 per cent. in all, on account of a rise or fall in the cost of living, as compared with the year 1919. A deduction of 7½ per cent. is at present being made on this account.

There are additional pensions not subject to the above reduction ranging from £65 to £350 per annum for officers who have held high administrative appointments as colonels or major-generals.

Officers on appointment are provided with free passage to India, normally by transport. The wives and families of officers who are married prior to the date of the officers' embarkation on first appointment will also be given free passage to India subject to the payment of messing charges. Officers are granted a certain number of return passages home at Government expense during their career. There are special allowances for officers whilst on study leave.

Further particulars can be obtained on application to the Secretary, Military Department, India Office, Whitehall, London, S.W.1. Letters should be marked "Recruitment for I.M.S."

MEDICAL BRANCH OF THE ROYAL AIR FORCE

THE Air Council attach great importance to attracting into the service the best type of medical man, since on the capacity of the Medical Branch depends in a peculiar degree the safety and efficiency of the Air Force. The duties of a medical officer in the Air Force include not only the prevention and treatment of those ordinary diseases to which the personnel of any fighting service are liable, but the special study of the mental and physical stresses imposed on the airman in diverse circumstances and climates—a new branch of medicine which still provides considerable scope for research.

As promotion to the higher ranks of the Service is by selection, and as a certain proportion of the higher ranks are reserved for purely professional as opposed to administrative appointments, it will be seen that there are excellent prospects for the young medical officer who exhibits ability and energy in his professional work.

The work to be done, therefore, has a high professional interest, combined with good rates of pay and allowances, so that a career is offered which should prove both attractive and interesting. The life is one which is certain to appeal to the man of wide outlook who desires opportunities for travel, sport, and games, and can find interest and enjoyment in aviation.

His duties will, as a matter of course, give him flying experience as a passenger, which is necessary for the proper study of the medical problems of aviation and for gaining first-hand knowledge of the conditions under which his comrades serve. He may also, if he wishes, undergo a certain amount of training as a pilot, when this can be arranged without interference with his duties.

The establishment consists partly of permanent and partly of short-service officers, and an officer on entry is granted a short-service commission for a period of three years on the active list (extensible to five years if the officer so wishes, on the recommendation of the Director of Medical Services) and of four years in the Reserve of Air Force Officers. Selections for permanent commissions are made from officers holding short-service commissions, and those who are not selected are transferred to the Reserve at the expiration of their period of service on the active list.

For those entrants who desire it, the opportunity of obtaining a permanent commission is one approaching 50 per cent., so far as can reasonably be estimated at present. But the short-service commission with its gratuity after three or five years is in itself an attraction to many entrants who desire to enlarge their experience and outlook from the point of view of subsequently entering private practice, and who, on entry, have not made up their minds to the adoption of a permanent career in the Service.

For certain purposes medical officers may be allowed to count as service their time spent in approved whole-time post-graduate appointments in civil hospitals under certain well-defined and generous conditions.

At about five years' service all permanent officers who are judged suitable will be given the opportunity to take a course of specialist study. The period allowed will vary with the subject of study, but normally about nine months will be available to each officer, during which full pay and allowances will be issued. Their subsequent career will normally be as follows. Approximately three-quarters of the employment of squadron leaders and senior flight lieutenants is in specialist posts, though these are not generally of a full-time specialist character. On reaching the rank of wing commander, the policy is to allow a proportion of officers to become permanent specialists and to be employed continuously throughout the remainder of their career in full-time specialist posts. Rather more than a quarter of the officers will become permanent specialists and continue to be employed as such throughout their service in the ranks of wing commander and group captain. In addition there are a number of hygiene posts in the former rank open to specialists in that subject, bringing the proportion of specialist posts in the rank up to nearly a half of the total posts. In the rank of group captain, apart from the posts already mentioned as available for the permanent specialist, employment is nearly equally divided between posts in charge of a large hospital and headquarter administrative posts. This statement indicates the position as regards specialist employment as at present foreseen. No guarantee can be given, of course, that the career of an individual will necessarily conform to this forecast.

New entrants into the Royal Air Force Medical Branch are commissioned as Flying Officers (Medical), and are eligible for promotion to the rank of Flight Lieutenant (Medical) after one year's service on full pay. Permanent officers are normally promoted to the rank of Squadron Leader after ten years' total service. Accelerated promotion may be granted after the completion of eight years' service to officers qualified to hold specialist appointments. Promotion within establishment to the ranks of Wing Commander and above is by selection. The number of permanent commissions granted yearly is regulated with a view to all suitable permanent officers being promoted to Wing Commanders and of a substantial majority of Wing Commanders being promoted to Group Captains. While the aim is to give entrants a career as above, no guarantee of promotion can be given to the individual officer, of course, since the number of vacancies for promotion must depend on the requirements of the Service from time to time.

There is no competitive examination on entry; candidates must be under 28 years of age. British subjects, the sons of British subjects, and of pure European descent, and are interviewed by a Board presided over by the Director of Medical Services, Royal Air Force, before acceptance. Each candidate must produce:—

1. Birth certificate. 2. Medical registration certificate. 3. A declaration containing the following information:

(*a*) Age and place of birth. (*b*) That he is a British subject, the son of British subjects, and of pure European descent. (*c*) That he is ready to engage for general service at home or abroad as required. (*d*) The qualifications he is possessed of, and what medical or other appointments he has held (if any). (*e*) That he is willing to fly as a passenger whenever called upon to do so.

Each candidate is required, before acceptance, to pass a medical examination to ensure that he labours under no constitutional or mental disease or weakness, nor any imperfection or disability which may interfere with the efficient discharge of the duties of a medical officer in any climate, in peace or war.

On appointment entrants undergo an initial course of three months, during which they are given instruction in the special medical aspects of aviation, the organisation and administration of the Royal Air Force, and the general and special duties to be performed by officers in the Medical Branch.

In order to avoid the necessity for further examinations the position of entrants in order of seniority in the Air Force List is determined at the end of the initial course by a system of marking and reports on the actual work done during their instruction.

UNIFORM AND EQUIPMENT

Medical officers are required to provide themselves with the uniform, service dress, and mess dress of their rank, and with the distinguishing badges of the Royal Air Force Medical Branch. The provision of full dress is entirely optional at present. An allowance of £50 towards the cost of uniform is made on joining to candidates who have not had previous commissioned service in H.M. Forces.

EMOLUMENTS

The emoluments of medical officers of the Royal Air Force are given in outline below. The rates of pay are fixed on an inclusive basis, and the fact that specialist pay and charge pay are not payable as separate emoluments was taken into account when the rates were fixed. The standard rates of pay and retired pay were fixed on the basis of the high cost of living in 1919, 20 per cent. of each standard rate being detachable and subject to alteration in relation to the cost of living. The rates were accordingly altered periodically between 1919 and 1932, but in the latter year it was decided in principle that variations in relation to the cost of living should cease and that pay should be consolidated; no final decision as to the date or terms of consolidation has been reached. The current rates represent a reduction of approximately 10 per cent. on the standard rates, and will continue to be issuable until further notice.

ALLOWANCES AT STATIONS ABROAD

In addition to the current pay shown above, officers stationed abroad are provided with furnished quarters (with fuel and light) and rations, or allowances in lieu, and receive colonial and servant allowances. The present total of the allowances (including colonial and servant allowances) payable when provision in kind is not available is as follows :—

Rank.	Egypt		Palestine		Malta		Malaya	
	M.	S.	M.	S.	M.	S.	M.	S.
	p.a. £	p.a. £	p.a. £	p.a. £	p.a. £	p.a. £	p.a. £	p.a. £
Flying Officer ..	409	216	438	228	269	116	540	251
Flight Lieutenant ..	409	216	455	228	269	116	540	251
Squadron Leader ..	409	268	455	281	269	132	540	277
Wing Commander ..	511	322	549	344	312	147	611	377
Group Captain ..	548	359	599	385	348	183	637	403

M. = married ; S. = single.

The married rates are payable only when the officer is accompanied by his family. If unaccompanied he is treated as unmarried for the purposes of his own accommodation, or allowances in lieu, and receives a consolidated allowance in respect of the separated family as follows :—

Flying Officer	£109 p.a.
Flight Lieut. and Squadron Leader..	£136 „
Wing Cmdr. and Group Captain ..	£173 „

Iraq and Sudan.—Families are normally not allowed in these countries, and officers are provided with accommodation, &c., for themselves, and receive colonial and servant allowances. The present rates of colonial allowance amount to £142 p.a. (Iraq) and £46 p.a. (Sudan). In addition, married officers receive the consolidated allowance for separated families at the rates shown above.

Aden and Transjordan.—Families are only allowed at these stations if public married quarters are available. Married officers accompanied by their families are accordingly provided with married accommodation, &c., and receive a servant allowance of 2*s.* a day and a colonial allowance of 10*s.* a day at Aden and 7*s.* in Transjordan. All other officers are provided with unmarried accommodation and receive servant allowance of 2*s.* a day and colonial allowance of 5*s.* a day at Aden and 3*s.* 3*d.* a day in Transjordan. In addition, married officers separated from their families receive the consolidated allowance at the rates shown above.

ROYAL AIR FORCE MEDICAL BRANCH: RATES OF PAY AND ALLOWANCES

Rank.	Pay.*			Cash allowances at home rates in lieu of quarters, rations, and servant, if not available in kind (per annum).†		Pay plus allowances per annum.	
	Daily rates.		Per annum (current rate).				
	Standard.	Current.		Married.	Unmarried.	Married.	Unmarried.
	£ s. *d.*	£ s. *d.*	£ s. *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Flying Officer ..	1 4 0	1 1 8	395 8 4	190 2 1	118 12 6	585 10 5	514 0 10
Flight Lieutenant— ..	1 6 0	1 3 4	425 16 8	228 2 6	118 12 6	653 19 2	544 9 2
After 2 years as such ..	1 8 0	1 5 2	459 5 10	228 2 6	118 12 6	687 8 4	577 18 4
After 4 years as such ..	1 10 0	1 7 0	492 15 0	228 2 6	118 12 6	720 17 6	611 7 6
Squadron Leader— ..	1 19 0	1 15 2	641 15 10	231 3 4	156 12 11	872 19 2	798 8 9
After 2 years as such ..	2 3 0	1 18 8	705 13 4	231 3 4	156 12 11	936 16 8	862 6 3
After 4 years as such ..	2 5 0	2 0 6	739 2 6	231 3 4	156 12 11	970 5 10	895 15 5
After 6 years as such ..	2 9 0	2 4 2	806 0 10	231 3 4	156 12 11	1037 4 2	962 13 9
Wing Commander— ..	2 15 0	2 9 6	903 7 6	234 4 2	185 10 10	1137 11 8	1088 18 4
After 2 years as such ..	2 17 0	2 11 4	936 16 8	234 4 2	185 10 10	1171 0 10	1122 7 6
After 4 years as such ..	3 3 0	2 16 8	1034 3 4	234 4 2	185 10 10	1268 7 6	1219 14 2
Group Captain	3 10 0	3 3 0	1149 15 0	305 13 9	246 7 6	1455 8 9	1396 2 6
Air Commodore	4 0 0	3 12 0	1314 0 0	361 19 2	307 4 2	1675 19 2	1621 4 2
Air Vice-Marshal ..	5 0 0	4 10 0	1642 10 0	422 15 10	368 0 10	2065 5 10	2010 10 10

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* Except for periods of service under Indian administration. For such periods officers receive pay and allowances at rates and subject to conditions authorised from time to time by the Government of India.

† These allowances are issued only when accommodation, fuel and light, rations, and personal attendance are not available in kind. Normally, provision in kind is available for junior officers. "Married" rates of allowances are payable only to married officers who have reached the age of 30 or the rank of Squadron Leader. The rates and general scheme of allowances are liable to revision as circumstances may require.

The rates of colonial allowance payable in Aden and Palestine and Transjordan are under review and will probably be reduced.

Retired Pay

The minimum period of service qualifying for retirement on retired pay is 20 years.

Standard scales of retired pay are as follows:—

AIR OFFICERS

Air Vice-Marshal ..	.. £790 to £1010 per annum.
Air Commodore ..	.. £650 „ £950 „ „

OFFICERS BELOW AIR RANK

Age on retirement.	Standard yearly rate of retired pay.	Years of service.	Addition for each extra year of service.*	Deduction for each deficient year of service.*
	£		£	£
40	300	17	15	15
41	337	17	15	15
42	375	18	15	15
43	412	18	15	15
44	450	19	15	15
45	487	19	15	15
46	525	20	15	15
47	562	20	15	15
48	600	21	15	15
49	637	21	15	15
50	675	22	15	15
51	697	22	22	15
52	720	23	22	15
53	742	23	22	15
54	765	24	22	15
55	790	24	22	15

* Limited to five years.

The maximum standard rates of retired pay and the compulsory retiring ages for the several ranks are:—

Rank.	Yearly rate of retired pay.	Compulsory retiring age.
	£	
Air Vice-Marshal ..	1010	60
Air Commodore ..	950	57
Group Captain.. ..	900	57
Wing Commander ..	600	55
Squadron Leader ..	500	55

Gratuities.—A permanent officer allowed to retire before having qualified for retired pay may be granted a gratuity, namely:—

£1000 if he has 5 but less than 10 years' commissioned service.
£1500 „ „ 10 „ „ 15 „ „ „
£2800 „ „ 15 or more than 15 „ „ „

Short-service officers who complete their full period of service on the active list will normally be granted gratuity as follows on transfer to the Reserve:—

After 3 completed years	.. £400
„ 5 „ „	.. £1000

These gratuities will not be payable to officers granted permanent commissions, but their service on a short-service commission will count towards retired pay.

THE GUILD OF ST. LUKE was founded 70 years ago by a few medical students, chiefly to meet their own religious needs. It now makes a wider appeal, and its membership is open to all students and practitioners of medicine, both men and women, who are members of the Church of England, the clergy of which are eligible as Clerical Associates. The Chapter meets at St. Nicholas Cole Abbey, London, E.C. Particulars of the objects and activities of the Guild can be obtained on application to the Secretary, Guild of St. Luke, 43A, Matheson-road, W.14.

COLONIAL MEDICAL SERVICE

THE Colonial Medical Service consists of the Medical Services in Bahamas, Barbados, Bermuda, British Guiana, British Honduras, British Solomon Islands Protectorate, Ceylon, Cyprus, Falkland Islands, Fiji, Gambia, Gibraltar, Gilbert and Ellice Islands Colony, Gold Coast, Hong-Kong, Jamaica, Kenya, Leeward Islands, Malaya, Mauritius, Nigeria, Northern Rhodesia, Nyasaland, Palestine, St. Helena, Seychelles, Sierra Leone, Somaliland, Tanganyika, Trinidad, Uganda, Windward Islands, and Zanzibar.

The various Colonial government medical departments employ some 1200 European medical officers and about the same number of qualified Asiatic and African medical officers who are appointed locally. Included in this total are about 30 qualified European women medical officers. About 850 trained nursing sisters and health visitors are employed, most of whom are Europeans. There are large numbers of subordinate personnel, sanitary inspectors, medical assistants, and dressers, most of whom are natives of the areas in which they serve.

Throughout nearly the whole of the Colonias Empire such diseases as malaria, yaws, leprosy, and hookworm disease menace the health of the indigenous people and retard the progress of development. In equatorial Africa sleeping sickness and plague persist, in West Africa yellow fever has not yet been eradicated, and in the Near and Far East outbreaks of cholera and plague occur from time to time. But in addition to tropical diseases, those maladies usually met with in this country are prevalent throughout the Empire.

An officer in the Colonial Medical Service thus has unique opportunities for the practice of his profession. On joining his medical department his duties include medical, surgical, and public health work. He may be posted to an outlying or bush station where he will be responsible for all the medical activities in connexion therewith; or he may be attached for duty at one of the large hospitals. Every encouragement will be given him to pursue any specialist work in which he may be interested in so far as the exigencies of the Service permit. Great importance is attached to a candidate's post-graduate experience, as in the outlying districts he will frequently be called on to deal with emergencies without being able to seek the advice and assistance of his colleagues.

VACANCIES

Vacancies for medical officers may occur at any time of the year, and are dealt with as circumstances require. The almost complete cessation of recruitment during the war period, coupled with the post-war expansion of staffs, particularly in the larger Colonies, resulted in an abnormally high rate of recruitment. The average for the six years, 1924 to 1929, was 104 vacancies per annum. In 1930 the number of vacancies fell to 77, due to the establishments of medical departments being almost at full strength. As a result of the general financial depression only 35 vacancies were filled in 1931, and the number was further reduced to 12 and 22 in 1932 and 1933 respectively. For the present, therefore, vacancies are likely to be very infrequent. In normal circumstances vacancies occur most frequently and regularly in Tropical Africa and Malaya. In the Bahamas, Barbados, Bermuda, Ceylon, Jamaica, and Mauritius, junior posts are practically always filled by the appointment of qualified local candidates. The vacancies for which candidates are selected from outside the Service are those for ordinary medical officers. Appointments for specialists are almost invariably reserved for officers who are already in the Service, and who have shown outstanding merit in a particular branch of medicine or surgery. Under normal conditions about six vacancies were to be expected annually, usually in

West Africa and in Malaya, for women medical officers.

QUALIFICATIONS

Applicants must be under 35 years of age, and preference is given to candidates under 30. For certain appointments candidates must be of European parentage.

Preference will be given to applicants who have held hospital or public health appointments or who have special knowledge of anæsthetics, radiology, surgery, medicine, ophthalmology, gynæcology and midwifery, diseases of the ear, nose, and throat, or venereal diseases. In the case of women medical officers experience in maternity and child welfare is almost essential.

Selected candidates will normally be required to undergo a course of instruction at the London School of Hygiene and Tropical Medicine or at the Liverpool School of Tropical Medicine or at Edinburgh University before taking up their appointments. The cost of tuition will be paid by the Government, but candidates must make their own arrangements for board and lodging. An allowance of £25 a month will be paid to them monthly in arrear while they are under instruction. Candidates who are successful in obtaining the diploma in tropical medicine and hygiene of London, Liverpool, or Edinburgh are granted a refund of their examination fees. If an officer has not taken a course of instruction in tropical medicine prior to appointment, he is usually required to take one during his first leave of absence and to obtain a satisfactory certificate before he can be confirmed in his appointment.

GENERAL CONDITIONS OF SERVICE

New entrants to the Service will be liable to transfer to any scheduled post therein, whether or not such transfer represents promotion, provided that:

(a) No officer whose first appointment is to an office in a Dependency in which he was ordinarily resident at the time of appointment shall be liable to be transferred to an office outside that Dependency unless and until he shall have accepted an office in another Dependency.

(b) No officer shall be transferred without his own consent to an office which in the opinion of the Secretary of State is of less value (due regard being had to climate and other circumstances) than that which he already holds.

Officers who do not hold scheduled posts are eligible to apply for transfer to such posts. Appointment, confirmation, promotion, retirement, and transfer of Medical Officers will be governed by the directions of the Secretary of State.

No officer of the Service is entitled, as of right, to private practice, the Service being envisaged as essentially a Service of whole-time officials whose primary duty is to the State.

In view of the present financial stringency it has been found necessary in certain Colonial Administrations to impose a temporary levy on salaries. The actual value of an appointment is often much greater than is indicated by the salary alone. An applicant should take into consideration whether the post is pensionable; whether free quarters are provided; whether any special local allowances are payable; whether free passages are provided on first appointment and when proceeding on leave; and whether free or assisted passages are provided for the wives and children of married officers. If local income-tax exists in a colony it is much lower than that payable at home.

The majority of appointments are pensionable. Officers appointed to pensionable posts serve on probation in the first instance, the probationary period varying in different services—e.g., two years in East Africa, three years in West Africa. Some appointments are temporary, and service in these does not qualify for pension unless the appointment is subsequently made pensionable.

Information as to the conditions and cost of living in the colonies, protectorates, and mandated territories is contained in a publication of that title (Colonial No. 56), which may be obtained from H.M. Stationery Office, price 3s. Further information as to the staffs, the climate, and local conditions will be found in Appendix III. of the Dominions Office and Colonial Office List, which also contains the rules as to leave of absence, free passages, &c. Leaflets concerning nearly all the tropical dependencies are issued for the use of intending settlers and others by the Oversea Settlement Department, Dominions Office, Caxton House, Tothill-street, London, S.W.1. A memorandum on Medical Appointments issued by the Colonial Office will be sent without charge on application to the Director of Recruitment.

Applications for medical appointments in the Colonial Service should be addressed to the Director of Recruitment (Colonial Service), Colonial Office, 2, Richmond-terrace, Whitehall, London, S.W.1. For the present no candidate will be considered by the Secretary of State for the Colonies who did not—if of suitable age—serve in some branch of His Majesty's Forces during the Great War, unless his reasons for not having done so are considered entirely satisfactory by the Secretary of State.

PARTICULAR CONDITIONS OF SERVICE

Tropical Africa

EAST AFRICA

Selected candidates are appointed as medical officers on probation in the first instance for two years, at the end of which period their appointments are made permanent if their service has been satisfactory, and a native language test has been passed. Later on a special course of study must be taken while on leave. Candidates can generally take their wives with them on first appointment.

Officers are provided with quarters free of rent or the Government may provide temporary accommodation, or an allowance in lieu of quarters may be paid. The salary of a medical or sanitation officer is £600 per annum, rising by annual increments of £30 to £840, and thence by increments of £40 to £920, subject to an efficiency bar at £840. Senior medical officers and senior sanitation officers are paid on the scale £1000 by annual increments of £50 to £1100. Officers who possess the Diploma in Public Health on entering, or who acquire it while in the Service, receive two special increments in the scale.

Officers are permitted to retire with gratuity, if they wish, instead of waiting to retire on pension as follows: (a) after nine years' service, of which at least six must have been spent in East Africa, £1000; (b) after twelve years' service, of which at least eight must have been spent in East Africa, £1250. If an officer elects to retire with gratuity he thereby forgoes all claim to pension.

The highest grades and salaries in the medical departments are as follows:—

Kenya.—Director of Medical and Sanitary Services, £1500; Deputy Director of Medical Service, £1200.

Uganda.—As Kenya.

Tanganyika Territory.—As Kenya.

Nyasaland.—Director, £1300; Medical Entomologist, £1000–£50–£1100.

Zanzibar.—Director of Medical and Sanitary Services, £1300; Resident Surgical Officer, £1000–£50–£1100.

Northern Rhodesia.—Director of Medical Services, £1300; Deputy Director of Medical Services, £1200.

There are also the following posts: medical superintendent and principal of medical school, Mulago Hospital (Uganda), £1150; sleeping sickness officer (Tanganyika Territory), £1000–£50–£1100; senior bacteriologists (Kenya and Uganda), £1000–£50–£1100.

Health officers are selected from the ranks of medical officers as occasion arises.

Leave of absence on full salary is granted in the normal case after a tour of resident service (varying from 12 to 15 months in Somaliland, 30 to 48 months in Kenya, 20 to 36 months in Northern Rhodesia, and 20 to 30 months in the other East African Dependencies, at the discretion of the Governor). Except in Kenya, Northern Rhodesia, and Somaliland the leave granted amounts to six days for each completed month of residence (or three days when for any reason the officer is not returning to East Africa), exclusive of the periods of the voyages to and from East Africa. Officers serving in certain stations in Nyasaland are allowed five or two and a half days' leave in respect of each month of service instead of six days or three days respectively.

Officers serving in Northern Rhodesia are allowed four days or two days. Officers serving in Somaliland are allowed seven or three and a half days after a tour of 12 to 15 months. Officers serving in Kenya are allowed three days for each month of residential service during their first two tours of service and four days for each month of residence during subsequent tours.

Free first-class passages are provided for the officer on first appointment and on leave, and in certain cases assistance towards family passages is given.

Pensions.—Officers on the pensionable establishment may retire (or be retired by the Government) on attaining the age of 50 years; but they may be retained in the Service, with their own consent, for such further period as the Government may recommend. Earlier retirement in the event of ill-health is also provided for. Pension of existing officers is computed at one-four hundred and eightieth of pensionable emoluments—i.e., salary and value of free quarters in respect of each month's pensionable service—at the time of retirement, subject to an average of emoluments for the last three years before retirement; but for new entrants the basis of calculation is one-six hundredth.

WEST AFRICA

Officers hold their appointments in the first instance on probation for three years from the date of their first arrival. After being placed on the permanent establishment this period is counted for pension. Officers are not allowed to take their wives and young children out with them without the sanction of the Governor. When, as is usually the case, an officer has obtained permission to be accompanied by his wife a grant of one-half the cost of his wife's passage to and from West Africa is made subject to certain conditions.

Leave.—European officers in West Africa may be granted vacation leave on full salary not exceeding in all one week's leave in the United Kingdom for every completed calendar month of total residential service in West Africa, plus the time necessarily taken on the journey to the United Kingdom, and, if the officer is returning to West Africa for further service, the time necessarily taken on the journey from the United Kingdom to the Colony. Vacation leave may be granted without any special grounds after 18 consecutive calendar months of residential service in West Africa. An officer will not be required to serve a tour of more than 24 consecutive calendar months' residential service except in special circumstances; and the Governor may grant vacation leave to any officer at any time after he has completed 12 consecutive calendar months' residential service. Within the above limits, the actual length of each officer's tour will be at the discretion of the Governor. Vacation leave on full salary may also be granted to an officer if he is invalided from West Africa after less than 12 consecutive calendar months' residential service, and sick leave on full salary may be granted for any period not exceeding six calendar months. In addition, local leave may be granted up to 27 days in any one tour.

The scale of salaries of the officers of the Medical Department, Nigeria, is as follows:—

Appointment.	Salary.	Remarks.
Director of Medical and Sanitary Service.	£1800	Duty allowance £360.
Deputy Director, Health Service.	£1500	Duty allowance £300.
Deputy Director of Medical Service.	£1500	Duty allowance £300.
Specialist Officers ..	£1300	Duty allowance £260. After five years' approved service the Deputy Director is eligible for a salary of £1400 with dutyallowance£280.
Assistant Director of Medical Service.	£1300	Duty allowance £260.
Assistant Director of Health Service.		
Senior Health Officers ..	£1050–£50–£1200	Duty allowance £210.
Senior Medical Officers	£1000–£50–£1150	Seniority allowance £100.
Deputy Director, Tsetse Investigation.	£800–£40–£960	Staff pay £150; Seniority allowance £72.
Senior Sleeping Sickness Officer.		
Research Medical Officer		
Superintendent, Dispensers' Training School.		
Pathologists	£660–£30–£720–£40–£960	—
Medical Officers of Health.		
Medical Officers ..		
Lady Medical Officers..		

The highest grades and salaries in the other West African medical departments are as follows:—

The Gambia.—Senior Medical Officer, £1000–£50–£1150.

Sierra Leone.—Director, Medical and Sanitary Services, £1400; Surgical Specialist, £1300; Assistant Director of Health Service, £1300.

The Gold Coast.—Director, Medical and Sanitary Services, £1600; Deputy Director of Medical Service, £1400; Deputy Director of Health Service, £1400; Specialist Officers, £1300.

The salary of a medical officer is at the rate of £660 a year, rising by annual increments of £30 to £720 a year. Then, if confirmed in the appointment, £720 a year, rising by annual increments of £40 to £960, with seniority allowance at the rate of £72 a year. Before passing £800, medical officers are required to take a special course of study for three months. If they obtain satisfactory certificates at the end of the course they draw their further increments up to £960 a year. A medical officer who has served for three years on the maximum salary of this scale (£960) without obtaining promotion is eligible, if recommended by the Governor, to be placed on the scale £1000–£50–£1150, with £100 seniority allowance (as for senior medical officers).

Research and Pathology.—There are a number of appointments for pathologists in Nigeria and the Gold Coast. The salary and other conditions attached to these posts are similar to those of medical officers of health.

African Medical Officers.—There are a number of Government appointments for African medical officers in the West African Colonies. These appointments carry a salary on the scale £500–£20–£600, and there are higher scales, £600–£30–£720 and £740–£820. In addition, in Nigeria and on the Gold Coast, arrangements have been made for the employment of a few young African medical men temporarily on the hospital staffs, with a view to appointment to the Government service later, if suitable. In such cases a salary of £400 a year is paid.

Eastern Colonies and Protectorates

MALAYA

Medical officers are appointed on the following scale of salaries: £700, rising to £770 during three years' probation; then, if they are placed on the pensionable establishment, rising to £805, and thence by annual increments of £35 to £1120, with a strict efficiency bar at £840.

Above the concluding figure of £1120 there are certain higher appointments, as follows: director of medical services, Straits Settlements, £1890; director, Institute for Medical Research, Federated Malay States, and principal, King Edward VII. College of Medicine, Singapore, £1540 each; some posts at £1470; and some posts at £1190, rising annually by £42 to £1400. Salaries are paid in dollars at 2*s.* 4*d.*

Information about general conditions in Malaya is obtainable from the Malayan Information Agency, 57, Charing Cross, London, S.W.1.

Leave.—Eight months' full-pay leave is normally granted: (*a*) after a tour of four years' resident service during the first eight years of resident service; (*b*) after a tour of three years' resident service during the next six years of resident service; (*c*) after a tour of two and a half years' resident service after 14 years' resident service. Additional leave on half-pay may be granted on special grounds. Officers are provided with free passages on first appointment for themselves and their families (i.e., wife and children) up to five persons, inclusive of the officer. On completion of each full tour, free return passages are given to all officers (with wife and children under the age of 10).

HONG-KONG

Officers are appointed on probation for three years. A diploma of public health is required for appointment as a health officer. The scale of salaries of the medical department is: director of medical and sanitary services, £1500–£50–£1800; deputy director £1300–£50–£1400; senior medical officer and senior health officer, £1200–£40–£1280; malariologist of port, bacteriologist, each £920–£40–£1280; port health officer and second port health officer, £860–£40 and one of £20 to £1280; health officers, £860–£40–£1220; assistant bacteriologist, radiologist, each £860–£40–£1220; medical officers, £700–£40–£1180. The currency of Hong-Kong is based on the silver dollar. For purposes of local payment salaries fixed in sterling are converted into dollars at the current rate of exchange. If furnished or unfurnished quarters are provided a rental of 7 per cent. or 6 per cent. on salary respectively is charged. In certain instances a rent allowance is paid instead.

West Indian Colonies

Jamaica.—District medical officers, if on a whole-time basis, draw £600–£25–£800 with travelling allowance and unfurnished quarters or an allowance in lieu. The public hospital, Kingston, has a staff of seven, the senior medical officer drawing £700–£50–£800. The chief post in the colony is that of superintending medical officer, £1000–£50–£1200. Whole-time officers are not allowed private practice. The age for voluntary retirement is 60. Pension is reckoned at the rate of one-sixtieth of the retiring salary for each year of service.

Trinidad and Tobago.—In Trinidad and Tobago Government medical officers receive salary at the rate of £400 per annum, rising by annual increments of £25 to £600. An officer appointed to a district receives, in addition to his salary, a travelling allowance varying from £100 per annum in a normal district to £150 per annum, and is allowed private practice, for which there is good scope. Officers employed in institution work receive a duty allowance varying from £50 to £300. Medical officers having completed 10 years' resident service are pensionable at the age of 55.

Windward Islands (Grenada, St. Lucia, St. Vincent). The chief medical officer, Grenada, receives £750, and also an allowance of £50 as bacteriologist. The chief medical officer, St. Lucia, receives £600–£700 plus transport and subsistence allowances; the post is pensionable, but private practice is not allowed except as a consultant. The chief medical officer, St. Vincent, receives £500–£600, with free quarters valued at £40. Most of the remaining appointments are district appointments with the right to private practice attached; the salaries paid by Government are, in Grenada, on the scale £500–£600, in St. Lucia, £400–£500, in St. Vincent, £400–£450. The Governor has the power to transfer a medical officer from one island to another. Appointments are pensionable.

Leeward Islands (Antigua, St. Christopher and Nevis, Dominica, Montserrat, Virgin Islands).—The appointments are similar in number and character to those in the Windward Islands, and are pensionable. An officer when first sent out is not appointed to a particular island but to the service of the Leeward Islands, with a salary of £350, and is later appointed to a definite district at a salary varying from £340 to £400–£25–£450, and the Governor decides as to the district which is to be allotted to him. He is liable to be transferred at the Governor's discretion to any medical district in the Leeward Islands. The medical officers, except in St. Christopher and Nevis, receive fees for successful vaccinations, post-mortem examinations, evidence at courts of justice, and certificates of lunacy. They are also, as a rule, allowed private practice.

British Guiana.—There are the following appointments in the medical service of the colony: surgeon-general, £1000–£1200 per annum, with consulting practice; resident surgeon and surgeon specialist, Georgetown, £1100; ophthalmologist, £700; medical superintendent, Leprosy Hospital, £700; 27 medical officers, £500–£25–£700. Most of the senior posts in institutions carry duty allowances (varying from £50 to £300 per annum) and quarters.

British Honduras.—The salary of an assistant medical officer is £500–£25–£650. The principal medical officer draws £825–£25–£850, paid in dollars. Unless they already possess a diploma of public health, medical officers are liable to be required, before they join the colony, to undergo a course of instruction at a laboratory of public health or analogous institution. The appointments are pensionable.

In British Guiana, Jamaica, and Trinidad officers are allowed to accumulate full-pay leave (at the rate of six weeks for each year's service) up to six months, and no leave of absence may (except in very special circumstances) exceed six months in all unless the officer has served for five years or more without leave, in which case two months on half-pay may be taken in addition to six months' full-pay leave.

Western Pacific

Fiji.—The chief medical officer receives £1000–£50–£1100, with free unfurnished quarters; the medical superintendent, Colonial War Memorial Hospital, £800–£25–£1000, and free quarters; the medical superintendent, Leper Asylum, £500–£25–£725, with completely furnished quarters and one servant; the medical officer of health, £750–£25–£900, no quarters provided. District medical officers receive £500–£25–£725, with partly furnished quarters or £50 house allowance (at the option of the Government). In certain districts horse allowances or car allowances are granted. In others a medical officer is provided with a launch or boat. District medical officers are allowed private practice on the understanding that their official duties are not neglected. In some districts the medical officer is also district commissioner and receives an additional allowance of from £175 to £235 and free partly furnished quarters. In most districts there is private practice, the value of which has been estimated at from £100 to £600 a year.

Western Pacific.—The staff in the British Solomons Islands Protectorate consists of a senior medical officer, £700–£50–£900, with partly furnished quarters and a local allowance of £50; one travelling medical officer, £550–£25–£650, with partly furnished quarters, a local allowance of £50, and a consolidated travelling allowance of £200.

In the Gilbert and Ellice Islands Colony there is a senior medical officer, £650–£25–£700, and an allowance of £100 to compensate for absence of private practice; partly furnished quarters are provided. One medical officer at £600–£25–£650, one at £700–£25–£800. Both these officers receive an allowance of £100 to compensate for absence of private practice; partly furnished quarters are provided.

Mediterranean Colonies

Cyprus.—There is a director of health, £1000–£25–£1200; district medical officers, £400–£20–£600, one of whom is allowed full private practice, and another consulting practice. The surgeon specialist, £600–£25–£750, is allowed consulting practice.

Gibraltar.—The surgeon of the Colonial Hospital receives £730, with private practice. There is one assistant surgeon, £600, for 3 years, thereafter £650–£25–£700, and one medical officer, £500–£25–£600–£50–£700. Both are allowed private consulting practice only. Free unfurnished quarters are provided. The Report of a Salaries Revision Committee is at present under consideration.

Island Group

Falkland Islands.—The senior medical officer is paid at the rate of £800 per annum, with free furnished quarters and £200 in lieu of private practice. Two medical officers receive £700–£25–£800 and £600–£25–£700 respectively, with quarters. Private practice is not allowed.

Seychelles.—The chief medical officer receives £600 and the resident surgeon £487 10*s.* per annum, with quarters. There are three assistant medical officers, two receiving £487 10*s.*, the other £275 10*s.* per annum, paid in rupees. Private practice is allowed.

St. Helena.—The colonial surgeon receives £550, with fees estimated at £20, and £30 transport allowance. Private practice is allowed.

Middle East

Palestine.—The grades and salaries of higher appointments in the department of health are: director, £1200, plus £200 expatriation allowance. Deputy director (not deputy director laboratories), £900–£50–£1100, plus £150 expatriation allowance; specialist surgeon (who is allowed a certain amount of private practice), and senior medical officers, £800–£25–£1000, plus £100 expatriation allowance. Government analyst, £550–£25–£800, plus £100 expatriation allowance. Payment is in Palestinian pounds, now equal to sterling. The remainder of the staff is recruited locally. Three months' leave with full pay can be taken every two years. Most of the senior appointments have been or will be made pensionable.

APPOINTMENTS NOT WITHIN THE COLONIAL SERVICE

Appointments in the self-governing Dominions and the territories administered by them—viz., Canada, the Commonwealth of Australia (including Papua, Norfolk Island, and the mandated territory of New Guinea), New Zealand (including the Cook Islands and the mandated territory of Samoa), the Union of South Africa (including the mandated territory of South West Africa), the Irish Free State, and Newfoundland—are entirely under the control of the respective Dominion Governments. For information with regard to them application should be made to the High Commissioners or Agents-General in London.

Sudan Medical Service

This service is responsible for carrying out civil and military medical and public health duties in the Sudan.

The staff consists of: (*a*) A director. (*b*) A senior physician and a senior surgeon to the Khartoum Civil Hospital. (*c*) An assistant director. (*d*) Medical officer of health, Khartoum Province. (*e*) 34 British "senior medical inspectors" and "medical inspectors" whose pay commences at £E.720 and rises, subject to the recommendation of the director, by five biennial increases to £E.1080, and after 13 years' service to £E.1200. All rates of pay are subject to an abatement of 7½%. The senior medical inspectors are eligible, by selection, for the senior posts. All medical inspectors are appointed, in the first place, on probation for two years, and if at the end of that time they are accepted for permanent service under the Sudan Government, the first increase of pay is subject to their passing an examination in Arabic.

In addition to the above there are (*f*) a number of medical officers trained at one of the Syrian medical schools, and (*g*) Sudanese medical officers trained at the school of medicine at Khartoum. There are several native (*h*) assistant medical officers, who have been given a purely practical training in one of the larger hospitals in the Sudan.

Amongst the attractions of the service are: The great variety of the work met with among many different races of the Sudan; *leave* of 90 days, generally granted every year after the first 18 months of service; *study-leave,* which may be given for some definite purpose. The pension for medical inspectors who retire after 20 years' service is not less than £E.500 a year. If, however, he serves for a longer period, or is appointed to one of the higher posts, he will receive a larger pension. Private practice is allowed, but is limited to a few of the larger towns, and may be carried on so long as it does not interfere, in any way, with official duties. These duties include acting as consultant to the principal hospitals and the supervision of medical and public health work, the inspection of schools, the examination of candidates for Government service and pension, and the training of assistant medical officers and native sanitary overseers. The Khartoum Medical School is staffed mainly by members of the medical service, who receive additional remuneration for their work as teachers. A registrar of the medical school is also selected from the service, who receives £E.250 a year extra pay.

Inquiries for further information should be made to the Deans of the Principal Medical Schools, and to Dr. Hodson, 69, Harley-street, W.

Southern Rhodesia.—Appointments are under the control of the Government of Southern Rhodesia. Information from the High Commissioner, Crown House, Aldwych, London, W.C.2.

Malta.—Inquiries should be addressed to the secretary to the Head of the Government, Valetta, Malta.

North Borneo.—Application to the British North Borneo Company, 17, St. Helen's-place, London, E.C.3.

Sarawak.—Appointments are in the hands of H.H. the Rajah. Information from the Sarawak Government Offices, Millbank House, London, S.W.1.

Basutoland, Swaziland, and the Bechuanaland Protectorate.—Appointments are made upon the recommendation of the resident commissioners, subject to the approval of the High Commissioner for South Africa and confirmation by the Secretary of State for Dominion Affairs. These appointments are usually filled by the selection of local candidates.

Shanghai Municipal Appointments.—Inquiries regarding appointments under the Shanghai Municipality, including appointments in the Shanghai Police Force, should be addressed to Messrs. J. Pook and Co., 68, Fenchurch-street, London, E.C.3.

Chinese Maritime Customs.—Inquiries regarding appointments should be addressed to the Inspector General of the Chinese Maritime Customs, 26, Old Queen-street, London, S.W.1.

Consular Appointments.—Application for appointments of a Consular nature should be addressed to the Foreign Office, London, S.W.1.

Trade Commissionerships.—Applications for appointment as trade commissioner in the colonies and elsewhere should be addressed to the Department of Overseas Trade (Development and Intelligence), 35, Old Queen-street, London, S.W.1.

WOMEN'S MEDICAL SERVICE FOR INDIA

AMONG careers open to medical women abroad the Women's Medical Service for India deserves honourable mention. The Service is open to fully qualified medical women of British or Indian nationality, and with the present amount of Government subsidy the number of medical officers is limited to 44. Medical women proceeding to India to join the Women's Medical Service receive a sufficient sum for a first-class passage to India. On landing they are posted to one of the larger women's hospitals to gain Indian experience and to learn the language. For a further period they are appointed to act temporarily for medical women on furlough. They are then definitely appointed to the charge of hospitals. Private practice is allowed, provided it does not interfere with official duties. The only exception is in administrative or educational posts, when an allowance in lieu of practice is given. The amount obtained from practice varies according to the station, but in most cases it forms a fair addition to the salary, varying from £150 to £1000 a year.

Excellent opportunities for surgery—especially gynæcological—are found in the Women's Medical Service. To those who are not keen surgeons opportunities are likely to open in the future in connexion with maternity and child welfare.

The cost of living in India is much higher than formerly, but it should be possible for a medical woman (with house provided) to meet actual household expenses for about Rs.300 per mensem, leaving the remainder of her salary for dress and personal expenses. To this must be added the necessary saving to meet additional expense for furlough and leave spent in the hills.

Rates of pay are as follows :—

Years of service.	Overseas allowance per mensem.	Salary per mensem.	English equivalent* per annum.
1 to 3	Rs.100	Rs.450	£440
4 to 6	"	Rs.500	£480
7 to 9	"	Rs.550	£520
10 to 12	"	Rs.600	£560
13 to 15	Rs.150	Rs.650	£600
16 to 18	"	Rs.700	£640
19 to 21	"	Rs.750	£680
22 to 24	"	Rs.800	£720
over 24	"	Rs.850	£760

* At rupee value 1s. 4*d.*

Furnished quarters are provided, representing an additional Rs.150 per mensem.

Leave on average pay is earned at the rate of 2/11ths of the period spent on duty.

Study-leave is granted to the extent of 12 months in the total service and will not be granted more than twice in the course of an officer's service. During study-leave an officer draws half average pay, with a study allowance at the rate of 12*s.* a day during the course of study. Officers of European domicile are entitled to four free return first-class passages from a port in India to a port outside India in their whole service. The first passage is not granted until after the expiry of four years' approved service, and thereafter passages may be granted at intervals of not less than four years. There is a Provident Fund to which members of the Service contribute 10 per cent. of their pay. The Service contributes another 10 per cent., which accumulates at interest and is repaid on retirement.

Admission to the Service is made by selection in India and England—preference being given to those with Indian experience. Vacancies are few. Candidates in the United Kingdom should apply to the Hon. Secretary, United Kingdom Branch of the Countess of Dufferin's Fund, care of India Office, Whitehall, London. Candidates in India should apply to the Chief Medical Officer, Women's Medical Service, Countess of Dufferin's Fund, Simla and Delhi.

PRISON MEDICAL SERVICE

CANDIDATES for the Prison Medical Service are approved by the Secretary of State for the Home Department on the recommendation of the Prison Commissioners. Preference is always given to candidates who have experience of lunacy. Application for employment may be made on a special form, which can be obtained from the Secretary, Prison Commission, Home Office, London, S.W. In the smaller prisons the medical officership is part-time, and is usually filled by practitioners in the locality, preference being given to those who have special experience of lunacy. In the large prisons the medical staff must devote their whole time to the Service. In the case of whole-time service, the appointment is in the first instance to the post of Medical Officer, Class II., and from this rank the Medical Officers, Class I., are selected as vacancies occur. The pay of the whole-time prison medical staff is as follows: Medical Officer, Class II., £505 7*s.* a year, proceeding by annual increments to £726 a year, the maximum being normally attainable after 10 years' approved service: Medical Officer, Class I., £783 15*s.* a year, proceeding by annual increments to £939 14*s.* a year, the maximum being normally attainable after 6 years' approved service. Unfurnished quarters are provided or an allowance in lieu is made. The conditions of service are liable to review. Study-leave is granted annually to two of the whole-time Medical Officers. There are 12 full-time medical officers of Class I. and 15 Class II. and 23 part-time medical officers. The number of vacancies is never large.

PHARMACEUTICAL SOCIETY

THE COLLEGE OF THE PHARMACEUTICAL SOCIETY is a constituent part of the University of London. The Society conducts examinations for registration as (*a*) Chemist and Druggist and (*b*) Pharmaceutical Chemist. Courses of Instruction are given for these examinations, in the latter case in conjunction with University College.

An Intercollegiate two years' course for the Final Examination for the degree of B.Pharm. of the University of London is also given in conjunction with University College. Medical students are admitted to the lectures and laboratory work. Certificates of instruction in the School are received by the Conjoint Board of the Royal Colleges and by the University of London. Graduates of approved Universities may carry out the research work necessary for the thesis for the Ph.D. of the University of London in the Society's Research Laboratories; this degree may be taken in Pharmacy, Materia Medica, Pharmaceutical Chemistry, and Pharmacology. Several scholarships are also offered. Further information may be obtained from the Dean, 17, Bloomsbury-square, London.

SOCIETY FOR CONSTRUCTIVE BIRTH CONTROL AND RACIAL PROGRESS (C.B.C.).—Post-graduate medical demonstrations of the technique of the use of a variety of contraceptive methods are given by Mrs. Marie Stopes, D.Sc., F.L.S., and Mrs. Evelyn Fisher, M.D. Each will include clinical demonstrations on women of various types, and those attending will be enabled to practise on patients the use of many different contraceptive devices. The dates of the demonstrations, which are free, can be obtained from the hon. secretary (108, Whitfield-street, London, W.1), as well as information about tickets of admission. There is a museum of contraceptives and a birth control library, which may be consulted any day (except Saturdays) from 10 A.M. to 6 P.M.

SPECIAL DIPLOMAS

DIPLOMA IN PUBLIC HEALTH

THE following epitomises the instruction given at various universities and centres of medical education to medical men desiring to obtain diplomas in sanitary science, public health, hygiene, or State medicine, as this discipline is variously called. Resolutions and rules, designed with a view of ensuring "the possession of a distinctively high proficiency, scientific and practical, in all branches of study which concern the public health," have been adopted at various times by the General Medical Council. The diploma is registrable by the Council, whose rules on the curriculum become binding on the educational bodies concerned. The present resolutions and rules, which came into force in 1931, postpone the granting of a diploma until at least two years from qualification.

London School of Hygiene and Tropical Medicine

The course of study for the Diploma in Public Health will commence on Oct. 1st in the premises in Keppel-street (Gower-street), the gift of the Rockefeller Foundation, which has excellent laboratories and research rooms, a fine lecture theatre and classrooms, library, and museum. The course, which will extend over a period of nine months for those prepared to give whole-time study, is designed in compliance with the requirements of the General Medical Council, and will enable students, who wish to do so, to proceed to the academic Diploma in Public Health of London University. The curriculum has been planned on very practical lines, and includes, in addition to work with Medical Officers of Health in selected areas, a large number of visits to places of public health interest. The course also includes provision for the necessary instruction in infectious disease and hospital management, lectures and demonstrations on physiology applied to hygiene and industry, medical industrial psychology, and sanitary engineering. A series of lectures is given by eminent authorities on special subjects, and these lectures are open to members of the medical profession as well as to students of the School. The London County Council, the City of London, and various other bodies have placed their resources at the disposal of the School for teaching purposes.

D.P.H. Studentship.—In the Public Health Course one place is allotted, without fees, after open competition, the successful candidate being awarded the Fishmongers' Company Studentship.

English Conjoint Board

The regulations for the Diploma in Public Health of the Royal College of Physicians of London and the Royal College of Surgeons of England are as follows:—

Candidates must have obtained a registrable qualification in medicine, surgery, and midwifery. The examination consists of two parts, both of which are held in January, June, and October, and candidates may enter for either part separately, or at the same time; the passing of Part I. must precede that of Part II. The examination will be written, oral, and practical. Part II. includes a practical examination in infectious diseases, food inspection, and inspection of selected premises. Candidates who fail in either part may sit at a subsequent examination on payment of the fees.

Candidates will be admissible to examination in Part I. on producing evidence of having attended during not less than 280 hours at an Institution recognised by the Examining Board in England, after obtaining a registrable qualification, practical instruction in (*a*) Bacteriology and Parasitology (including Immunology, Serology, Medical Entomology, &c.), especially in their relation to diseases of man and to those diseases of the lower animals which are transmissible to man; (*b*) Chemistry, Physics, Radiology, and Electrology in relation to Public Health; (*c*) Physiology and Biochemistry in their application to nutrition and hygiene; (*d*) Meteorology and Climatology in relation to Public Health.

Candidates will be admitted to Part II. of the Examination on producing evidence (1) Of having been in possession of a registrable qualification in medicine, surgery, and midwifery, during not less than two years, of being registered by the General Medical Council, and of having completed the curriculum for the Diploma extending over a period of twelve calendar months (or an academic year of whole-time study covering a period of not less than nine calendar months) subsequent to the attainment of a registrable qualification. (2) Of having attended, after obtaining the registrable qualification, instruction during not less than 120 hours at an Institution recognised by the Examining Board in England in the following subjects: (*a*) The Principles of Public Health and Sanitation; (*b*) Epidemiology and Vital Statistics; (*c*) Sanitary Law and Administration (including Public Medical Services); (*d*) Sanitary Construction and Planning. (3) Of having attended for three months the clinical practice of a hospital for infectious diseases recognised by the Examining Board in England, and of having therein received instruction in the methods of administration. (At least 24 daily attendances of not less than 2 hours are necessary.) (4) Of having been engaged during a period of not less than six months in acquiring a practical knowledge of the duties, routine and special, of public health administration under the supervision of a medical officer of health, and of having received from such officer or other competent medical officer during not less than three hours on each of 60 working days, practical instruction in those duties and also those relating to (*a*) Maternity and Child Welfare Service; (*b*) Health Service for children of school age; (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food, including meat and milk. (Instruction in (*a*) to (*f*) must include attendance at the centres, clinics, institutions, and premises concerned.) The above certificate (4) must be obtained from a medical officer of health who devotes his whole time to public health work, or from a medical officer of health of a sanitary area having a population of not less than 50,000, or in Ireland the medical superintendent of health of a county or county borough having a population of not less than 50,000.

University of London

The course of study for the Academic Diploma in Public Health extends over twelve calendar months (or an academic year of whole-time study covering a period of not less than nine calendar months). The examination is in two parts and candidates must pass in all subjects of Part I. before being admitted to Part II. The course for Part I. consists of not less than 280 hours' practical instruction in (*a*) Bacteriology and Parasitology; (*b*) Chemistry, Physics, Radiology, and Electrology in relation to Public Health; (*c*) Physiology and Biochemistry in their application to nutrition and hygiene; (*d*) Meteorology and Climatology in relation to Public Health. The course for Part II. consists of not less than 120 hours' instruction in (*a*) Principles of Public Health and Sanitation; (*b*) Epidemiology and Vital Statistics; (*c*) Sanitary Law and Administration; (*d*) Sanitary Construction and Planning.

Parts I. and II. of the Examination are held twice a year.

Candidates for the M.D. Degree may offer Hygiene as a subject in which to graduate (not registrable as a public health diploma). The regulations may be obtained on application to the Academic Registrar, University of London, South Kensington, S.W.7.

University of Durham

The degree of Bachelor of Hygiene (B.Hy.), and the Diploma in Public Health (D.P.H.). A period of not less than two years must elapse between the attainment by a candidate of a registrable degree or qualification in Medicine, Surgery, and Midwifery, and his admission to the Final Examination for the degree of Bachelor of Hygiene or for the Diploma in Public Health of the University *as the case may be*. The curriculum extends over a period of not less than twelve calendar months (or an academic year of whole-time study, covering a period of not less than nine calendar months), subsequent to the attainment of a registrable degree or qualification. Candidates for the B.Hy. must take out the curriculum for Part I. of the Examination at the University of Durham, but for the D.P.H. may do so either at the University or at any medical school or institution recognised by the University. The examination is divided into two parts. Part I. is practical, written, and oral, and includes the subjects of Bacteriology and Parasitology (including Immunology, Serology, Medical Entomology, &c.), especially in their relation to diseases of man, and to those diseases of the lower animals which are transmissible to man; Chemistry, Physics, Radiology, and Electrology, in relation to Public Health; Physiology and Biochemistry in their application to nutrition and hygiene; and Meteorology and Climatology in relation to Public Health. The subjects in Part II. include the Principles of Public Health and Sanitation; Epidemiology and Infectious Diseases; Vital Statistics; Sanitary Law and Administration (including Public Medical Services); Sanitary Construction and Planning; and Public Health Administration. This part of the examination is written and oral, and includes practical examinations in Infectious Diseases, Food Inspection, Inspection of premises, dwelling-houses, factories, workshops, schools, &c. Candidates are not admitted to the examination in either part until after they have completed the prescribed courses of instruction in the required subjects.

Doctor of Hygiene (D.Hy.): Candidates must be Bachelors of Hygiene of the University of two years' standing, and are required to satisfy the examiners that they have conducted original research in the subject of Public Health.

University of Birmingham

The University grants the Degree M.D. (State Medicine) under the following conditions: Graduates in medicine of *this University* may become candidates for the degree when they possess a Diploma in Public Health (D.P.H.) recognised for registration by the General Medical Council; or a recognised Degree in Public Health or Hygiene; they must have been engaged for at least one year subsequently to obtaining a registrable Diploma in Public Health, in post-graduate study of State Medicine, pursued in a laboratory of the University or in a hospital associated with the University, or whilst holding an appointment in the Public Health Service, or partly in each of such places, provided that the full period of post-graduate study occupies not less than one year and is taken after a subject of study has been approved by the Faculty of Medicine. The candidate presents a thesis on some public health subject and must pass a written and viva voce examination in the principles and practice of public health.

A candidate whose thesis is of exceptional merit may be exempted from the whole or any part of the examination, and Honours are awarded at the discretion of the Examiners.

Graduates in medicine of other Universities who possess a degree of a British or Colonial University recognised for registration by the General Medical Council and approved by the Senate of the University, and who have taken not less than three years of their curriculum in the Birmingham Medical School, may become candidates for the Degree of M.D. (State Medicine) under similar conditions as are required in the case of graduates of the University of Birmingham. Graduates in medicine of other approved Universities who are not past students of the Birmingham Medical School may become candidates for the Degree of M.D. (State Medicine) under the above regulations on completing *two* years of post-graduate study under the general conditions laid down above.

The University grants a Diploma in Public Health under conditions approved by the General Medical Council. The examination is held in March and June (Part I.), October and March (Part II.), each part being written, oral, and practical. No candidate will be allowed to pass Part II. until he has passed Part I. Candidates may enter for Parts I. and II. separately or at the same time. The fee for each part of the examination is £6 5s.

University of Liverpool

The University grants a Diploma in Public Health (D.P.H.), and every facility is afforded for training in Sanitary Science and State Medicine.

University of Leeds

The University grants a Diploma in Public Health, and every facility is afforded for training in Sanitary Science and State Medicine. The examination, which is held twice in each year—namely, in March and September—is in two parts, and is written, oral, and practical. Candidates must pass in Part I. before being admitted to Part II. Instruction in Entomology and Meteorology is given in the first term, and in Sanitary Chemistry and Bacteriology, Physiology, and Biochemistry, as applied to nutrition, Radiology and Electrology, in the first and second terms. Practical work under arrangement with the Leeds City Council. Prospectus can be obtained from the Academic Sub-Dean of the Medical School.

University of Bristol

Diploma in Public Health. Candidates must be at least 23 years of age, shall be fully registered medical practitioners of not less than two years' standing as such, and shall have passed the examination prescribed by regulations.

University of Wales

Candidates for the Diploma in Public Health, the curriculum for which extends over a period of not less than twelve calendar months, or an academic year of whole-time study covering a period of not less than nine calendar months, subsequent to the attainment of a registrable qualification, must produce evidence of having pursued at the Welsh National School of Medicine courses of instruction in Bacteriology and Parasitology, Chemistry, Physics, Radiology and Electrology, and Meteorology and Climatology in relation to Public Health, and Physiology and Biochemistry in their application to nutrition and hygiene. Candidates must also satisfy the examiners that they have received instruction approved by the University in the Principles of Public Health and Sanitation, Epidemiology and Vital Statistics, Sanitary Laws and Administration, and Sanitary Construction and Planning. The candidate must produce evidence that he has attended for three months on the clinical practice of a hospital for infectious diseases containing not less than 100 beds, and has received therein instruction in the methods of administration, and has been engaged in acquiring a practical knowledge of the duties, routine and special, of a public health administration. The examination for the diploma is divided into two parts, Part I. and Part II. A candidate must pass in all the subjects of Part I. before being admitted to Part II. of the examination. In Part I., and also in Part II., a candidate must pass in all the specified subjects at one time. Part I., practical, written, and oral, comprises Bacteriology and Parasitology. Part II. of the examination, which is written and oral, comprises:—The principles of Public Health and Sanitation, Epidemiology and Vital Statistics, Sanitary Law and Administration (including Public Medical Services), and Sanitary

Construction and Planning. No candidate can be admitted to Part II. of the examination until after the lapse of not less than two years from the date of his obtaining a registrable qualification. The examination in Part I. will be held in June, that in Part II. in October. Full information may be obtained from the Registrar of the University, University Registry, Cathays Park, Cardiff.

University of Edinburgh

Candidates for the Diploma in Public Health must be graduates in medicine and surgery of the University, or hold corresponding degrees or registrable medical qualifications which must be registered before admission to examination. The course is divided into two parts. In each part the candidate *must pass in all the specified subjects at one examination.* Candidates are not admitted to Part II. until they have passed Part I., nor until after the lapse of not less than two years from the date of obtaining a registrable medical qualification. The subjects of the examination are: Part I. (written, oral, and practical), Bacteriology and Immunology; Entomology and Parasitology; Chemistry, Biochemistry, and Physiology in their application to nutrition and hygiene; Physics, Radiology, Electrology, Meteorology, and Climatology in relation to Public Health. Part II. (written, oral, and practical), Hygiene, Sanitation, and Sanitary Construction; Epidemiology and Infectious Diseases; Sanitary Law and Vital Statistics; Public Health Administration. There is also included practical examinations in Infectious Diseases, Food Inspection, and Inspection of Premises. The course, which extends over an academic year of full-time study, begins in October, and provision is made by the University for instruction in all the subjects. Detailed particulars may be obtained from the Dean of the Faculty of Medicine.

University of Aberdeen

Every candidate for the Diploma in Public Health must be a graduate in medicine of the University of Aberdeen, or of any other University whose medical degrees are recognised as qualifying for registration by the General Medical Council of the United Kingdom. No candidate will be admitted to the Final Part of the Examination for the Diploma until after the lapse of not less than two years from the date of his obtaining a registrable qualification in Medicine, which qualification shall have been registered before such admission. The whole of the prescribed curriculum of study must be undertaken after the candidate has obtained a registrable qualification in medicine, and shall extend over not less than twelve calendar months (or an academic year of whole-time study covering a period of not less than nine calendar months). At least one *academic* term must be spent at the University of Aberdeen. Candidates shall produce evidence of having complied with the following requirements in respect of study and training:—1. Practical instruction in the following subjects within a laboratory or laboratories approved by the University during not less than 280 hours: (*a*) Bacteriology and Parasitology (including immunology, serology, medical entomology, &c.) in relation to diseases of man and diseases of lower animals transmissible to man; (*b*) Chemistry, Physics, Radiology, and Electrology in relation to Public Health; (*c*) Physiology and Biochemistry in their application to nutrition and hygiene; (*d*) Meteorology and Climatology in relation to Public Health. The above instruction to extend over not less than five months or two academic terms. 2. A course or courses of instruction extending over not less than 120 hours dealing with: (*a*) The Principles of Public Health and Sanitation; (*b*) Epidemiology and Vital Statistics; (*c*) Sanitary Law and Administration (including Public Medical Services); (*d*) Sanitary Construction and Planning; such course or courses to be given at an institution or by a teacher or teachers approved by the University. 3. Practical instruction, clinical and administrative, within a recognised hospital for general infectious diseases; such instruction to extend over three months, and to include 24 daily attendances of not less than two hours each. 4. Practical instruction and experience, during not less than six months (including attendance of at least three hours on each of sixty working days) in the duties, routine and special, of public health administration, under the supervision of a medical officer of health, who shall certify that the candidate has received from this officer or other competent medical officer practical instruction in these duties and also in those relating to: (*a*) Maternity and Child Welfare Service; (*b*) Health Service for Children of School Age; (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food, including meat and milk. (Instruction in (*a*) to (*f*) shall include attendance at the centres, clinics, institutions and premises concerned.) The medical officers of health recognised for this purpose by the General Medical Council are: (*a*) a medical officer of health who devotes his whole time to public health work; or (*b*) the medical officer of health of a sanitary area having a population of not less than 50,000; or (*c*) in Ireland, the medical superintendent officer of health of a county or county borough having a population of not less than 50,000. The examination for the diploma is divided into two parts, each of which extends *over not less than three days. A candidate* must pass in all the subjects of Part I. before being admitted to the examination for Part II. In Part I. and also in Part II. a candidate must pass in all the specified subjects at one time.

University of Glasgow

Degree of B.Sc. in Public Health.—Candidates must *be graduates in* Medicine of a University of the United Kingdom, or of some other University recognised for the purpose by the University Court. Candidates must produce evidence (1) that, after they have obtained a registrable Degree in Medicine, a period of not less than two years has elapsed; (2 that, after they have obtained a registrable degree in Medicine, they have, during a period of not less than 21 calendar months, pursued the course of work and instruction prescribed, and have satisfied the examiners *in the prescribed examinations.*

There are two examinations. Part I. includes the following subjects: (i) Bacteriology and Parasitology (including Immunology, Serology, and Medical Entomology); (ii) Chemistry, Physics, Radiology *and Electrology in relation to Public Health*; (iii Physiology and Biochemistry in relation to Public Health; (iv) Meteorology and Climatology in relation to Public Health; (v) Higher Chemistry in relation to Public Health; (vi) Higher Physics and Geology. A candidate must pass in the subjects marked (i), (ii), (iii), and (iv) of Part I. at one examination. Part II includes the following subjects: (vii) Hygiene and Sanitation (including sanitary construction and planning); (viii) Epidemiology and Infectious Diseases; (ix) Sanitary Law and Vital Statistics; (x Public Health Administration; (xi) Applied Hygiene The examination for Part II. includes practical examinations in Infectious Diseases; Food Inspection Inspection of Premises, such as dwellings, factories workshops, bakehouses, dairies, cowsheds, schools hospitals, clinics, and the like. The examination in Applied Hygiene *may be on a selected subject pro*fessed by the candidate. A candidate must pass in the subjects marked (vii), (viii), (ix), and (x) of Part II at one examination. *Diploma in Public Health (D.P.H.).*—Candidates for this Diploma must be *legally qualified medical practitioners* who are matriculated students of the University. A period of not less than two years must elapse between the attainment by the candidate of a registrable medical qualification and his admission to the final examina*tion (Part II.) for the* Diploma. The candidate must during a period of not less than twelve calendar months subsequent to his attainment of a registrable medica qualification pursue the course of work and instruction prescribed, and pass the prescribed examinations. The examination, which is both written and oral, is divided into two parts, Part I. and Part II., each of which extends over not less than two days. No candidate is admitted to either part of the examination until he has completed the prescribed courses of instruction in the subjects of that part. No candidate is admitted to Part II. until he has passed in all the subjects of Part I., nor until after the lapse of not less than two years from the date of his obtaining a registrable medical qualification, nor unless he presents a certificate showing that his name and qualification have been duly registered in the Medical Register. Part I. includes: (i) Bacteriology and Parasitology (including Immunology, Serology, and Medical Entomology); (ii) Chemistry, Physics, Radiology, and Electrology in relation to Public Health; (iii) Physiology and Biochemistry in relation to Public Health; (iv) Meteorology and Climatology in relation to Public Health. A candidate must pass in all the subjects at one examination. Part II. includes: (v) Hygiene and Sanitation (including Sanitary Construction and Planning); (vi) Epidemiology and Infectious Diseases; (vii) Sanitary Law and Vital Statistics; (viii) Public Health Administration. A candidate must pass in all the subjects at one examination. The examination for Part II. includes practical examinations in Infectious Diseases; Food Inspection; Inspection of Premises, such as dwellings, factories, workshops, bakehouses, dairies, cowsheds, schools, hospitals, clinics, and the like.

University of St. Andrews

The Diploma in Public Health is open to those who hold a registered medical qualification of the United Kingdom. The examination is in two parts. (1) (*a*) Bacteriology and Parasitology; (*b*) Chemistry and Physics; (*c*) Meteorology and Climatology. (2) Public Health and Sanitation, Epidemiology and Vital Statistics, Sanitary Law and Administration, and Sanitary Construction and Planning. Before admission to the first examination the candidate must have held his medical qualification for one year, and before admission to the second examination for two years. Graduates in Medicine of the University of St. Andrews may take part or all of the qualifying classes in any University of the United Kingdom, or in any Indian, Colonial, or Foreign University or medical school recognised by the University Court, but holders of other registered medical qualifications must spend at least 8 out of the 12 months' curriculum in St. Andrews University. A complete course is given in the Conjoint Medical School, Dundee.

Scottish Conjoint Board

All candidates for the Diploma in Public Health must have a qualification which has been registered under the Medical Acts. The examination is divided into two parts.

For Part I. the candidate must produce evidence of having received during a period of not less than five months at an institution recognised by the Board practical instruction in: (*a*) Bacteriology and Parasitology (including Medical Entomology), especially in their relation to diseases of man and to those diseases of the lower animals which are transmissible to man, during 180 hours, of which not less than 150 hours have been occupied in practical laboratory work; (*b*) Chemistry and Physics in relation to Public Health during 90 hours, of which not less than 70 hours have been occupied in practical laboratory work; (*c*) Meteorology and Climatology in relation to Public Health during not less than 10 hours. For Part II. evidence must be given of having received instruction during not less than 80 hours in: (*a*) The Principles of Public Health and Sanitation for not less than 30 hours; (*b*) Epidemiology and Vital Statistics for not less than 20 hours; (*c*) Sanitary Law and Administration (including Public Medical Services) during not less than 20 hours; (*d*) Sanitary Construction and Planning during not less than 10 hours; of having attended for three months the clinical practice of a recognised hospital for infectious diseases; and of having been engaged during a period of not less than six months in acquiring a knowledge of Public Health administration in addition to practical instruction in the duties relating to: (*a*) Maternity and Child Welfare Service; (*b*) Health Service for Children of School Age; (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food, including meat and milk. The fee is 12 guineas for both examinations, or 6 guineas for either of them. A fee of 6 guineas is payable by rejected candidates for either examination. The examination is held twice yearly, in March in Glasgow, and October in Edinburgh. The published regulations provide detailed synopses of the subjects of examination. The Registrar for Edinburgh is Mr. David Thomson, 18, Nicolson-street, and for Glasgow, Mr. David Willox, 242, St. Vincent-street.

University of Dublin (Trinity College)

The Diploma in Public Health is conferred, after examination, under the following conditions. The candidate must be a registered medical practitioner and have obtained a registrable qualification at least two years before the second part of the examination. The candidate must have completed, subsequently to obtaining a registrable qualification, 218 hours' practical instruction in a chemical and bacteriological laboratory, or laboratories, approved by the University, must have received instruction in the following subjects: physics, radiology, electrology, physiology, biochemistry, meteorology, and climatology, the principles of public health and sanitation, epidemiology and vital statistics, sanitary law and administration (including public medical services), sanitary construction and planning; must have studied, practically, outdoor sanitary work for six months under an approved officer of health, and must have attended for three months at a fever hospital where opportunities are afforded for the study of methods of administration. The De Renzy Centenary Prize, value about £15, is awarded to the candidate who obtains the highest marks at the March and June examinations each year, provided sufficient merit is shown. A special prospectus may be obtained by application to the Registrar of the School of Physic, Trinity College, Dublin.

National University of Ireland

At this University there is a Diploma in Public Health; a B.Sc. in Public Health; and a D.Sc. in Public Health.

All information obtainable from the Registrars of the Constituent Colleges—University College, Dublin; University College, Cork; University College, Galway.

University of Belfast

A Diploma in Public Health is given by examination. Courses of instruction are given both for Part I. and Part II. of the examination, extending over a period of one academic year. The curriculum follows that laid down by the General Medical Council.

Irish Conjoint Board

Every candidate for the Diploma in Public Health must observe the following rules: (1) A period of not less than two years shall elapse between the attainment by a candidate of a registrable qualification in Medicine, Surgery, and Midwifery and his admission to the Final Examination for a Diploma or Degree in Sanitary Science, Public Health, or State Medicine. (2) The curriculum for a Diploma or Degree in Sanitary Science, Public Health, or State Medicine shall extend over a period of not less than twelve calendar months (or an academic year of whole-time study covering a period of not less than nine calendar months) subsequent to the attainment of a registrable qualification. (3) Every candidate shall produce evidence of having attended, during not less than 280 hours, at an institution approved by the Licensing Body granting the Diploma or Degree, practical instruction in (*a*) Bacteriology and Parasitology, especially in their relation to diseases of man, and to those diseases of the lower animals which are transmissible to man; (*b*) Chemistry, Physics, Radiology, and Electrology in relation to Public Health; (*c*) Physiology and Biochemistry in their application to nutrition and hygiene; (*d*) Meteorology and Climatology in relation to Public Health. (4) Evidence must be produced of having received, during not less than 120 hours, at an institution approved by the Licensing Body granting the Diploma or Degree, instruction in (*a*) the Principles of Public Health and Sanitation; (*b*) Epidemiology and Vital Statistics; (*c*) Sanitary Law and Administration (including Public Medical Services); (*d*) Sanitary Construction and Planning. (5) Evidence of attendance for three months on the clinical practice of a recognised hospital for Infectious Diseases, and has received therein instruction in the methods of administration. At least 24 daily attendances of not less than two hours each shall be required. (6) Evidence is required that the candidate has, during a period of not less than six months, been engaged in acquiring a practical knowledge of the duties, routine and special, of Public Health Administration under the supervision of a Medical Officer of Health.

The examination for Part I. is practical, written, and oral. The examination for Part II. is written and oral, and includes practical examinations in Infectious Diseases; Food Inspection; Inspection of Premises—dwellings, factories, workshops, schools, &c. No candidate may be admitted to Part II. of the examination for a registrable Diploma or Degree in Public Health until after the lapse of not less than two years from the date of his obtaining a registrable qualification in Medicine, Surgery, and Midwifery.

Royal Institute of Public Health

Facilities are offered at this Institute for the course of instruction for the Diploma in Public Health. The laboratories are well equipped and pleasantly situated. In the Chemical Department lectures and courses of practical instruction are given by Dr. Alan W. Stewart, D.Sc. The Bacteriological Laboratories are under the charge of Dr. E. Goodwin Rawlinson, where practical instruction in Public Health, Bacteriology, and lectures on Immunology are given. The analysis, both chemical and bacteriological, of water, milk, sewage effluents, &c., are undertaken at the Institute. Pathological examinations and investigations are carried out for medical practitioners. The Aschheim-Zondek test for pregnancy is also carried out in the Pathological Department. The Harben Lectures will be delivered in October by Prof. W. J. Tulloch, O.B.E., M.D., Professor of Bacteriology in Dundee University. Further information may be obtained on application to the Secretary at the Offices of the Institute, 23, Queen-square (and Guilford-street), London, W.C.1.

DIPLOMA IN TROPICAL MEDICINE

Although a qualification in tropical medicine has not been made registrable by statute, a diploma is regarded as indispensable for appointments in the Colonial Medical Service and similar positions abroad. Systematic instruction for these diplomas is given at the Incorporated Liverpool School of Tropical Medicine (founded in 1898) and at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, London, W.C.; while the University of Edinburgh and the English Conjoint Board grant a diploma.

London School of Hygiene and Tropical Medicine

The course of instruction in tropical medicine and hygiene is divided into two parts: Section A, a three months' course in clinical and laboratory instruction, and Section B, a two months' course in tropical hygiene. Each section can be taken independently of the other, and the examinations of the Conjoint Board follow closely upon the end of the corresponding course of study. This revised course is recognised by the University of London as a course for associate students. The dates of the courses for the session 1934–35 are as follows:—Section A (Clinical and Laboratory Instruction): first course, Oct. 1st to Dec. 21st, 1934; second course, Jan. 7th to March 30th, 1935; third course, April 8th to June 28th, 1935. Section B (Tropical Hygiene): first course, Jan. 31st to March 22nd, 1935; second course, April 23rd to June 21st, 1935. The course of instruction under Section A includes clinical tropical medicine, applied pathology, medical zoology, and elementary bacteriology. Section B[*] comprises instruction in tropical hygiene, including, in relation to hygiene, bacteriology, medical zoology, anthropology, and vital and medical statistics. Section A is so arranged, in three self-contained groups or blocks, as to allow of the admission of a student at the beginning of any block of work, subject to a place in the laboratory being available. Accordingly, applications can be received for admission to the classes in Protozoology and Hæmatology (approximately four weeks), or in Helminthology (approximately four weeks), or in Entomology (approximately three weeks), with, in each case, if the student so wishes, the corresponding clinical demonstrations, instruction in applied pathology, and special lectures. Further, students wishing to attend the clinics and clinical lectures only can do so for any period of four weeks during the course. The instruction in the Division of Clinical Tropical Medicine is given by the medical staff of the Hospital for Tropical Diseases and by visiting lecturers. In this way the resources of the hospitals of the Seamen's Hospital Society at Endsleigh-gardens, at the Albert Docks, and elsewhere, become available for the clinical instruction of the students at the School.

Liverpool School of Tropical Medicine

The Liverpool University Diploma of Tropical Medicine (D.T.M.) is open only to those who possess a qualification to practise medicine recognised by the university, and who have been through a full course of instruction at this school. The subjects of examination are (*a*) Parasitology; (*b*) Entomology; (*c*) Tropical Medicine, including Ætiology, Symptoms, Pathology, Diagnosis, and Treatment of Tropical Diseases. The advanced course consists entirely of Practical and Clinical Work, given at the Laboratory at the University, and at a recognised hospital in which beds are specially reserved for Tropical Diseases. Applications should be made to the Dean of the Medical Faculty, University of Liverpool.

The University also grants a Diploma in Tropical Hygiene (D.T.H.). The subjects of examination are (*a*) Tropical Hygiene (including Sanitary Engineering, Vital Statistics and Epidemiology, and Applied Parasitology and Entomology; (*b*) Practical Sanitation; (*c*) Bacteriology; (*d*) Chemistry (including Meteorology and Climatology). Two University Fellowships of £100 a year each are open to students of the school, amongst others. Accommodation for research work is to be had at the University Laboratory. The Mary Kingsley Medal is awarded by the school for distinguished work in connexion with *Tropical Medicine*.

University of Edinburgh

Candidates for the Diploma in Tropical Medicine and Hygiene must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualifications of some other licensing body, or of other universities or medical schools specially recognised. The course of instruction, comprising a primary and a second course, is given during the autumn and spring terms, October to March, and includes Tropical Hygiene, Bacteriology, Entomology and Parasitology, Diseases of Tropical Climates (systematic and clinical), Tuberculosis, and Venereal Diseases. Provision is made in the University for instruction in all subjects.

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[*] The Andrew Balfour Memorial Fund provides yearly two free courses in Section B as Balfour Studentships.

The examinations are written, oral, and practical, and are held at the end of the courses. Candidates are required on the first occasion of presenting themselves for examination in either part to appear for all the subjects of that part. Candidates who fail to pass the entire examination in either part within a period of 12 months after first appearance are required to reappear for all the subjects. The University is included in the list of institutions whose courses of instruction in Tropical Medicine may be taken by officers on appointment to the Colonial Medical Services or during study-leave. Full particulars can be obtained from the Dean of the Faculty of Medicine.

English Conjoint Board

The Board conducts an Examination three times a year for the D.T.M. & H. granted by the Royal Colleges—namely, in January, April, and July. The Examination comprises written, oral, and practical examinations in the following subjects: *Section A*, Clinical Tropical Medicine and Surgery; applied Pathology, Zoology, and Elementary Bacteriology. *Section B*, Tropical Hygiene, including Epidemiology, Medical Zoology, and Bacteriology in relation to Hygiene. Candidates may enter for either or both Sections of the Examination provided that Section A is taken before Section B. (Candidates who are unsuccessful in Section A will not be debarred from presenting themselves for Section B.) Candidates must give 14 days' notice, in writing, to the Secretary at the Examination Hall, 8–11, Queen-square, London, W.C.1, and produce at the same time the necessary certificates of study (after Dec. 18th, 21 days' notice will be required). Candidates must produce evidence of being in possession of a registrable qualification in Medicine, Surgery, and Midwifery, and of having attended subsequently to obtaining such registrable qualification:—(i) *for admission to Section A:* Practical instruction in Pathology, Protozoology, Helminthology, Entomology, and Bacteriology in an Institution recognised for this purpose, together with the clinical practice of a hospital recognised for the study of Tropical Diseases, during not less than three months; (ii) *for admission to Section B:* Instruction in Tropical Hygiene and Sanitation in an Institution recognised for this purpose during a further period of not less than two months. Graduates (M.B., B.S., or M.D.) in Medicine and Surgery of Indian, Colonial, and foreign Universities recognised by the Examining Board in England, whose degrees are not registrable in this country, may enter for the Examination for the Diploma in Tropical Medicine and Hygiene on fulfilling the conditions in regard to study. These conditions may be modified at the discretion of the Committee of Management in the case of a candidate (*a*) who has been employed in foreign (in the case of Naval Medical Officers, one or more commissions abroad must have been held) or Colonial Medical Service, (*b*) who has been engaged in professional work in tropical countries, (*c*) who produces evidence of having been engaged in original investigations in Tropical Medicine or Hygiene. Further particulars from the Secretary, Examination Hall, Queen-square, London, W.C.1.

DIPLOMA IN PSYCHOLOGICAL MEDICINE

The Universities of London, Durham, Leeds, Manchester, Edinburgh, Dublin (Trinity College), Ireland (National University), and the English Conjoint Board grant diplomas in psychological medicine under conditions that are fairly comparable in the standard of the tests and in the duration of the courses; the details on these points can be obtained from the various examination bodies.

University of London

In London, courses of instruction for the Diploma in Psychological Medicine are given annually at the Maudsley Hospital, Denmark Hill, which has recently been definitely recognised as a school of the University of London. The course consists of two parts, commencing in January, and is adapted for the diploma of the Conjoint Board also. The parts may be taken separately; also during the year there are other short courses, lectures, and demonstrations in psychological medicine.

Maudsley Hospital.—Appointments as clinical assistants are obtainable at the Maudsley Hospital. The holding of such appointments for varying periods satisfies the requirements of the different examining bodies in respect of practical study of mental disorders. The appointments and other facilities for clinical experience are open to qualified medical practitioners apart from the courses of instruction. A course for the Diploma in Psychological Medicine is held annually from January to June at the Central Pathological Laboratory of the London County Mental Hospitals, which is situated in the Maudsley Hospital. Facilities and grants-in-aid are given for research work in psychiatry and allied subjects at the Laboratory. Inquiries as to lectures should be addressed to the Director of the Central Pathological Laboratory, Maudsley Hospital, Denmark Hill, S.E.; and as to clinical facilities, to the Medical Superintendent at the same address.

Bethlem Royal Hospital.—A course of lectures and practical instruction for the Diploma in Psychological Medicine, granted by the various universities and the Conjoint Board, is held at Bethlem Royal Hospital, Monks Orchard, Eden Park, Beckenham, twice annually, during the spring and autumn when possible. Part A or Part B, however, may be taken separately. In addition to the above, clinical instruction in Psychological Medicine is given at Bethlem Royal Hospital every morning (except Wednesdays) at 11 A.M. A reduction is made to those who attend the Diploma Course. House physicians are appointed at Bethlem Royal Hospital for a term of six months, which may be extended. These appointments are made at the beginning of February, May, August, and November in each year, and the vacancies are advertised in the medical papers. Apartments, complete board, attendance, and laundry are provided, and a salary at the rate of £150 per annum for the first three months, rising, if commendable service be given, to the rate of £200 per annum for the second period of three months. Clinical assistants are often appointed from time to time for periods of three months or longer. These are non-salaried and non-resident posts, but partial board is provided. The Physician-Superintendent, Bethlem Royal Hospital, Monks Orchard, Eden Park, Beckenham, will supply further particulars.

University of Durham

The university grants a diploma in psychiatry, and at the College of Medicine there is a department of instruction in psychological medicine. The candidate must be a registered medical practitioner, and subsequent to qualification have followed instructions on anatomy and physiology of the brain and nervous system. The examination is divided into two parts, Part I. dealing with anatomy, physiology, pathology, and bacteriology; Part II. with psychology and experimental psychology. Candidates may present themselves for the whole examination or for either part separately. The course of training is very detailed, post-mortem technique being the subject of a series of sessions, the same holding good for psychiatry and experimental psychology.

University of Leeds

The university grants a diploma in psychological medicine to graduates in medicine of at least one year's standing, who can prove that they have received systematic instruction on the normal and morbid anatomy of the brain and have held an appointment in a mental hospital. The examination is divided into three parts: Part I. deals with general psychology and the structural development and physiology of the nervous system; Part II. with the pathology of that system; and Part III. with clinical psychiatry, the administration of mental hospitals, and the medico-legal aspects of insanity. Candidates may present themselves for the three parts simultaneously or separately; they may submit a thesis or published work which, if approved, will gain certain exemptions.

University of Manchester

The university grants a diploma in psychological medicine to graduates of at least one year's standing. The examination is held in two parts. Before presenting themselves for Part I. candidates must, subsequent to qualification, have attended approved courses in the structure of the nervous system and in experimental psychology. Before presenting themselves for Part II. they must produce evidence of having gone through an approved course of instruction in the pathology of the nervous system and in clinical neurology, and of having attended demonstrations in psychological medicine, and received clinical instruction, either as residents or as daily attendants, at an approved hospital for mental diseases. The course extends over a period of three university terms, two of which must be taken in the university, and candidates may present themselves for both parts simultaneously or each separately.

University of Edinburgh

Candidates for the Diploma in Psychiatry must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualifications of some other licensing body, or of other universities or medical schools specially recognised. Candidates are required subsequent to the date of graduation or obtaining a recognised qualification to have held (*a*) a resident appointment for one year in a hospital for mental disorders approved by the Faculty of Medicine, or alternatively (*b*) a six months' appointment as defined in (*a*) and six months' practical study of nervous diseases in a special or general hospital approved by the Faculty of Medicine. There are two examinations for the Diploma. Part I. comprises: 1. Anatomy of the Nervous System; 2. Physiology of the Nervous System; 3. Psychology and Experimental Psychology. Part II. comprises: 1. Neuropathology; 2. Clinical Psychiatry; 3. Clinical Neurology; 4. An additional subject selected by the candidate from a prescribed list. Candidates who have held an asylum appointment for a period of five years or more may be exempted from the course of study in one or more subjects of the curriculum. New regulations are at present under consideration. Full particulars can be obtained from the Dean of the Faculty of Medicine.

University of Dublin (Trinity College)

A post-graduate diploma in Psychological Medicine is conferred upon registered medical practitioners who have held a resident medical appointment at a recognised institution for the treatment of Mental Diseases for 12 months, or who have held such an appointment for six months and have attended clinical instruction at an approved institution for six months. Candidates must also attend special courses of instruction and pass a special examination. Details can be obtained from the Registrar of the School of Physic, Trinity College, Dublin.

National University of Ireland

This University confers a diploma in Psychological Medicine. The diploma may be conferred on registered medical practitioners who although they may not have matriculated at the University shall have completed the prescribed course of study. A certificate of post-graduate work will be required from the candidates, either in the study of mental disease or as medical assistant in an asylum. Application should be made to the Registrars of the Constituent Colleges, University College, Dublin, University College, Cork, and University College, Galway, for all information.

DIPLOMA IN OPHTHALMIC MEDICINE

Special diplomas in ophthalmic medicine and surgery are issued by two examining bodies.

University of Oxford

The diploma in ophthalmology (D.O.) is granted to registered medical practitioners after passing an examination, held annually in June, which is open to candidates who have pursued at Oxford a course of study in ophthalmology over a period of at least two months and who have attended a 12 months' course of clinical ophthalmology at a recognised hospital. Further information regarding these requirements may be obtained from the Dean of the Medical School.

English Conjoint Board

The Conjoint Board grants the D.O.M.S. after an examination held in two parts, twice yearly in February and July. Part I. comprises anatomy and embryology of the visual apparatus, physiology of vision, and elementary optics. Part II. comprises optical defects, ophthalmic medicine and surgery, and pathology with special reference to ophthalmology. The examination in each case is written, oral, and practical or clinical. Candidates may only enter for Part II. on completion of a year of special study of ophthalmology after obtaining a recognised qualification.

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY

University of Cambridge

Before admission to any course for the Diploma a candidate shall produce evidence that he holds a medical qualification approved by the committee and also satisfy the committee that he has had sufficient post-graduate clinical experience. The next course, which begins on Oct. 3rd, 1934, occupies nine months. The first four months, which can be spent either in Cambridge or in London, are occupied with (*a*) lectures and practical work in Physics, in preparation for the examination for Part I. in February, (*b*) an introductory course of clinical instruction in Radiology and Electrology, (*c*) a course of instruction in Pathology in relation to Radiology and Electrology. The next three months must be spent in London, and are occupied with (*a*) lectures and demonstrations in Radiology and Electrology (including Radium Therapy) organised by the British Institute of Radiology, (*b*) clinical instruction in the Radiological Department of a hospital approved by the committee. During the final two months of the course a candidate must hold a clinical clerkship or similar appointment in the radiological department of a hospital approved by the committee. This part of the course may be done in London, or elsewhere. The examination for Part II. will be held in July. Further particulars as to courses and examinations may be obtained from Mr. G. Stead, M.A., Secretary for the Diploma, Cavendish Laboratory, Cambridge, or the General Secretary, British Institute of Radiology, 32, Welbeck-street, W.1.

University of London

The course for the post-graduate diploma in Medical Radiology extends over one academic year, and is open to registered medical practitioners and graduates in medicine of this or any other approved University. The subjects are: Part I., Physics and Electro-technology. Part II., (*a*) Radiology and Radio-diagnosis; (*b*) Radiotherapy. The examination is held in March and December (Part I.), and in June and December (Part II.). Particulars may be obtained from the Academic Registrar.

University of Liverpool

Candidates before admission to the examination for the D.M.R.E. must possess a registrable qualification approved by the University in medicine and surgery, and must have attended courses of instruction in (*a*) physics (two terms), (*b*) (i) radiology, and (ii) electrology during nine months in the X ray and electrotherapeutic department of a hospital or hospitals. An examination is held in March and June (Physics) and in June (Radiology and Electrology). Examination in either part may be taken separately. A registration deposit fee of £5 5*s*. is charged on application and credited to the fees, but is not returnable in the event of the candidate failing to register. These courses commence during the first week in October. Application should be made to the Dean, Faculty of Medicine, the University of Liverpool.

University of Edinburgh

Candidates for the Diploma in Radiology (D.R. Univ. Edin.) must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualifications from some other licensing body, or of other universities or medical schools specially recognised. Candidates are not admitted to the examination for the Diploma until after the lapse of not less than one year from obtaining a recognised qualification. The course of study begins in October and extends over a period of not less than three terms. The examination, which is written, oral, and practical, is in two parts: (*a*) Physics, and (*b*) Radiology. Full particulars may be obtained from the Dean of the Faculty of Medicine.

English Conjoint Board

The examination for the D.M.R., R.C.P. and S. comprises Part I. Physics, as applied to Radiology, and Part II. Medical Radiology, with special reference to its clinical application, including Radio-diagnosis, X Ray Therapy, and Radium Therapy. Both examinations, which are written, oral, and practical, are held during January and July. The course of study extends over one academic year of full-time study, subsequent to the attainment of a recognised qualification. Before admission to the examination the following certificates must be produced. For admission to Part I. evidence of having attended a course of instruction in physics as applied to radiology at a recognised medical school or institution for not less than three months. For admission to Part II. evidence of having attended at a recognised hospital courses of instruction, theoretical and practical, in medical radiology, including radio-diagnosis, X ray therapy, and radium therapy, with clinical experience for three terms.

Candidates may enter for Parts I. and II. either together or separately, subject to the production of the required certificates; but no candidate is permitted to proceed to Part II. of the examination until he has passed in Part I. Candidates must give 21 days' notice, in writing, of their intention to present themselves for examination, to the Secretary at the Examination Hall, 8–11, Queen-square, London, W.C.1, forwarding at the same time the necessary certificates of study. The conditions regarding admission to examination may be modified at the discretion of the Committee of Management in the case of a candidate (*a*) who has carried out original investigations in any subject of the examination, or (*b*) whose studies have extended over a prolonged period of time without fulfilling the exact conditions. Exemption will not be granted from any part of the examination.

DIPLOMA IN LARYNGOLOGY AND OTOLOGY

English Conjoint Board

The Board grants the D.L.O. after an examination held in two parts, in June and December. Part I. comprises anatomy, embryology, and physiology of the ear, nose, pharynx, larynx, trachea and bronchi. and œsophagus. Part II. comprises the medicine. surgery, and pathology of the ear, nose, pharynx, larynx, trachea and bronchi, and œsophagus, and the recognition and use of special instruments and appliances. The examination in each case is written, oral, and practical or clinical. Candidates may only enter for Part II. on completion of one year of special study of the diseases of the ear, nose, pharynx, and larynx, after obtaining a registrable qualification, or a degree in medicine and surgery of a University recognised by the Board.

DIPLOMA IN TUBERCULOUS DISEASES

University of Wales

Candidates for this diploma must be registered practitioners of at least 25 years of age. They are divided into two categories. First, they must either have held an appointment for tuberculous work for not less than five years; or, secondly, must have been qualified for at least one year, when they must present certificates of post-graduate study during that period on the clinical and pathological aspect of tuberculosis. The certificates have to be from recognised sources—a university, school, or hospital, where such a course is given, or a certificate from a whole-time member of the staff at an approved tuberculosis hospital or sanatorium will be accepted. A certificate of three months' satisfactory attendance at a tuberculosis institute or dispensary recognised by the Ministry of Health is also recognised as a valid testimonial. The examination is in two parts. Part I., written and oral, deals with clinical and epidemiological problems, the examination of patients, and the recognition of specimens; Part II. is a written and practical examination on the pathology and bacteriology of tuberculosis. This second half of the examination may be remitted for candidates who are in the first category (see above). These candidates may submit a thesis or copies of published articles on the subject in lieu of sitting for examination.

DIPLOMA IN BACTERIOLOGY

University of London

The course of study for the Academic Post-graduate Diploma in Bacteriology extends over one academic year and is open to (*a*) Graduates in Medicine, Science, and Pharmacy of this or another approved University, whose previous training has, in the opinion of the University, fitted them to profit by the Course; and (*b*) registered medical practitioners and other students who, though not graduates, have obtained a qualification and undergone a previous training which, in the opinion of the University, has fitted them to profit by the Course.

A Course necessary to fulfil the regulations of this Diploma has been planned by the London School of Hygiene and Tropical Medicine, Keppel-street, London, W.C., and full particulars with regard to the Diploma may be obtained from the Academic Registrar, University of London, South Kensington, S.W.7.

DIPLOMA IN CLINICAL PATHOLOGY

University of London

The course of study for the Academic Post-graduate Diploma in Clinical Pathology extends over one calendar year, and is open to graduates in Medicine and to registered medical practitioners. The subjects are (1) Morbid Anatomy and Histology; (2) Bacteriology and Serology; (3) Biochemistry. The examination is held in December. Particulars may be obtained from the Academic Registrar, University of London, South Kensington, S.W.7.

EAST SUFFOLK AND IPSWICH HOSPITAL.—In 1933 there were 5009 in-patients, a small increase, and the average number on the general waiting-list was only 114. There were 18,479 out-patients, and the year ended with an adverse balance of £386. In-patients stayed, on the average, 18·69 days, and cost £2 14*s*. 4*d*. each per week. Out-patients cost 6*s*. 8·68*d*. each.

DENTAL SURGERY

TEACHING INSTITUTIONS IN DENTISTRY

REGISTRATION on the Medical Register entitles a practitioner to practise dentistry, although he cannot register as such without degree or licence in dentistry; but few dental appointments at general or special hospitals or dispensaries are available save to those with a special diploma, and, until registered on the Dentists Register, no dental work under the Additional Benefit Scheme of the National Health Insurance Act can be undertaken.

The Examining Bodies in Dentistry which grant degrees and diplomas in the subject are as follows: Royal College of Surgeons of England, Royal College of Surgeons, Edinburgh, Royal Faculty of Physicians and Surgeons of Glasgow, Royal College of Surgeons in Ireland, and the following Universities: Birmingham, Bristol, Durham, Leeds, Liverpool, London, Manchester, Sheffield, St. Andrews, Dublin (Trinity College), Queen's University of Belfast, and the National University of Ireland. The student should apply to the secretaries of the various Conjoint Boards or to the Deans of the medical faculties or medical schools for a syllabus.

TEACHING INSTITUTIONS IN LONDON

Royal Dental Hospital

The Royal Dental Hospital of London, School of Dental Surgery, Leicester-square, is a school of the University of London. The school provides the special dental education required by the University of London for the B.D.S. Degree and the Royal College of Surgeons for the Licence in Dental Surgery. The general part of the curriculum may be taken at any general hospital. The hospital is open from 9 A.M. to 6 P.M., there being one staff for the morning and another for the afternoon of each day. Pupils are received for the training in dental mechanics recognised by the curriculum. The instructor at the commencement of each session gives a course of lectures on Operative Dental Surgery. The two senior house surgeoncies and the six house surgeoncies are held for four months each and are open to all qualified students. The lecturers, in addition to their lectures, give special demonstrations on the Microscopy of Dental Anatomy and Dental Surgery. The lecturer on Dental Mechanics also gives practical demonstrations in the laboratory. There is an Entrance Scholarship in Chemistry and Physics of the value of £25. One Scholarship in Dental Mechanics and Metallurgy, value £25. For full information as to scholarships and prizes, and other matters connected with the course, application should be made to the Dean.

University College Hospital

This Hospital and School, situated at the corner of Great Portland and Devonshire-streets, W., has recently been thoroughly reorganised, and is now fully equipped with all the most modern appliances. Students are entered as students of University College Hospital, and, as such, attend the classes of Anatomy and Physiology in University College, which is a few minutes' walk from the Dental Department in Great Portland-street, hitherto known as the *National Dental Hospital*—the first Dental School to admit Women Students. Practical courses to comply with the R.C.S. curriculum are held. Clinical Lectures and Demonstrations are given, and each student on entering passes through a preliminary course under a demonstrator. A prospectus containing full information as to lectures, fees, and prizes may be had on application to the Sub-Dean for Dental Students, who attends at University College Hospital Medical School, University-street, W.C.1, on Wednesday mornings from 9.30 to 10.30, and at other times by appointment.

Guy's Hospital

The work of the Dental Department begins daily at 9 A.M. both in the anæsthetic rooms and in the conservation room. The Extraction Rooms: These rooms have now been entirely reconstructed. There is ample accommodation for extractions, both with general and local anæsthetics, together with waiting- and retiring-rooms. Patients are admitted between 8.45 and 9.30 A.M., and are seen by the dental surgeon for the day, the staff demonstrators, the dental house surgeons, and the dressers. The Conservation Room is open from 9 A.M. till 5 P.M., and is under the charge of the Director. It affords accommodation for about 100 dental chairs, with the necessary equipment of the most modern type for the use of the Dressers, who, under the supervision of the Staff, perform the various operations of Dental Surgery. There is a separate room for denture patients affording accommodation for 15 chairs and a separate department for children with accommodation for 20 chairs. The Members of the staff attend every morning and afternoon to give demonstrations and otherwise assist students in their work in the Conservation Room and Prosthetic Laboratory. The Probationers' Laboratory is supervised by the Director of the Conservation Room assisted by the Staff Demonstrators, and instruction is given in operative dentistry on a "mannikin" to students during their first three months of clinical study. Students in Dental Prosthetics are received, and a graded, systematic, and full course of instruction, extending over two years, is carried out under the supervision of the Director of the Prosthetic Laboratory, assisted by four demonstrators, a house surgeon, and skilled mechanics.

Dental students have the opportunity of attending at this hospital the whole course of instruction required by the examining board for the B.D.S. Lond. or L.D.S. Eng.—viz., the complete course in dental prosthetics, the special lectures and practice of the Dental Department, and the general lectures and practice of the Medical School. Students who enter for a medical as well as a dental course are allowed to pursue their study of Dentistry during any period of their medical course most convenient to themselves without further charge.

Fourteen house surgeons, 20 assistant house surgeons, and 4 student demonstrators of Dental Histology are appointed annually. The following appointments are held by students: Full surgeon's dresser, assistant surgeon's dresser, dresser in the children's department, casualty dresser, dresser to the director of the conservation room, probationary dresser, clerk to the anæsthetist and dresser in the general anæsthetic and local anæsthetic rooms. Two Entrance Scholarships are awarded annually in April as follows: (1) A War Memorial Scholarship in Arts of the value of £40 per annum for four years, open to students under 19 years of age. Candidates are required to take English and any two of the following subjects: French, German, Latin, Greek, and Mathematics. (2) A Science Scholarship of the value of £40 per annum for four years, open to students under 20 years of age. Candidates are required to take two of the following subjects: Chemistry, Physics, and Biology. Further information will be supplied by the Dean of the Medical School.

King's College Hospital

The *Dental School* is part of the Medical School of King's College Hospital, and was opened in November, 1923. The Dental Out-patient Department of the Hospital is used for the performance of dental extractions. A large Conservation Room with provision for 40 dental chairs has been equipped. Smaller rooms are used for clinical teaching and administrative requirements, and a specially equipped laboratory for training in the art of dental mechanics. An X ray apparatus has been installed for use in dental skiagraphy. The Dental museum contains a large number of specimens illustrating oral, buccal, dental, and other diseases. The library, lecture theatre, lecture rooms, common rooms, and the refectory are all available for the use of students. Courses of study, including practical work, are provided for the degree of Bachelor of Dental Surgery of the University of London, and for the Diploma in Dental Surgery of the Royal College of Surgeons of England. Special arrangements are made for those students who wish to take a medical degree or qualification in addition to a degree or diploma in Dental Surgery.

The following salaried appointments are open to qualified members of the School: Registrar, Resident House Surgeon, Non-Resident House Surgeon, and Tutors in Dental Mechanics, Operative Dental Surgery, and Dental Materia Medica.

Full particulars of the Dental School may be obtained on application to the Dean, or to the Secretary of the Medical School, King's College Hospital, Denmark Hill, London, S.E.5.

London Hospital

This school is a part of the London Hospital and Medical College, and is fully equipped on the most modern lines and with the latest appliances. It provides a complete curriculum in all subjects for the B.D.S. Degree and for the L.D.S. Diploma, and is admirably adapted for the purpose of teaching. The Conservation Room is well lighted and ventilated, and fitted with pump chairs of the latest pattern; the fountain spittoons at many of the chairs have been specially designed. Each spittoon has attached to it a saliva ejector, hot and cold water, compressed air, gas and electric current, also a swing bracket to carry the student's cabinet. Electric sterilisers are supplied in each department and motor engines where required. The school possesses, in addition to the Theatres, Laboratories, and Museums in the College, a special Museum of Dental Anatomy and Surgery, Operative Dentistry, Prosthetic and Extraction Rooms, an X Ray Room, and Laboratories for Practical Metallurgy and Prosthesis. A systematic course of instruction is arranged for pupils. The up-to-date Laboratory contains every modern apparatus, and is in charge of a skilled curator and his assistants. Entrance Scholarship: Francis Farmer Entrance Scholarship in Science, value £25; no age limit. Subjects: Chemistry and Physics. Prizes: The Harold Fink Prize in Operative Dental Surgery, value £8 8s.; the "London" Prize in Dental Prosthesis, value £6 6s. Prizes are also offered for competition at the end of each of the courses of lectures in the curriculum. Connected with the Medical College and Dental School are a Library, Athenæum, Clubs' Union, Dining Hall with moderate tariff, and an Athletic Ground. A new Residential Hostel has been opened, and provides accommodation for 50 students. For full particulars as to Scholarships and Prizes, fees and course of study advised, apply to the Dean of the Medical School.

TEACHING INSTITUTIONS OUTSIDE LONDON

Birmingham Dental Hospital

The Dental Hospital in Great Charles-street has accommodation for 100 students. The equipment is in accordance with the most modern requirements for the efficient teaching and practice of Dental Surgery, including Radiology and a department for Practical Pathology and Bacteriology. The hospital, both internally and externally, has been renovated, and several departments have been reconstructed. The operations performed annually average 70,000, including gold and other fillings, crowns, bridges, porcelain inlays, jacket crowns, and injections for block and infiltration anæsthesia. The orthodontic department is one of the foremost in the country. The prosthetic and mechanical department is large and well lighted and two highly skilled instructors are always present, while two honorary officers give daily demonstrations. Application for information as to fees and scholarships must be sent to the Dean of the Medical Faculty, Birmingham University, or the Dean of the Dental Hospital, Birmingham.

Leeds University School of Dentistry

The School of Dentistry is adequately equipped to provide for the complete training of the dental student. It forms a part of the Leeds School of Medicine whilst the instruction in clinical and mechanical dentistry is carried out in the Dental Hospital. The School is now in occupation of a spacious new building especially designed to the requirements of modern dental teaching. The School is also the dental department of the General Infirmary, and its close association with the work of that institution ensures an adequate supply of clinical material, and enables a fuller insight into the position dental surgery holds in relation to general medicine and surgery, especially with regard to the major diseases and injuries of the head and neck. The courses of study are mainly designed to meet the requirements of the B.Ch.D. and L.D.S. Leeds, but every opportunity is afforded to students preparing for the degrees or diplomas of other licensing bodies. Full-time teachers give the instruction in clinical dental surgery, prosthetic dentistry, and mechanics, which is carried out under the supervision and direction of the Professor of Clinical Dental Surgery and members of the Honorary Staff. Special facilities are provided for instruction in Orthodontia, Radiography, Local and General Anæsthetics, and Bacteriology. Prizes are offered for competition to students in their respective years of study. Post-graduate clinical courses are arranged in collaboration with the Dental Board of the United Kingdom, and facilities exist to meet the requirements of dental surgeons desirous of obtaining special post-graduate instruction. Communications should be addressed to the Warden, School of Dentistry, Leeds, from whom a prospectus may be obtained.

University of Manchester School of Dental Surgery

Courses of study are provided to meet the requirements for the B.D.S. Degree and the L.D.S. Diploma of the University of Manchester, and for the L.D.S. Diploma of the Royal College of Surgeons of England. At the Dental Hospital instruction is given in practical Dental Mechanics, Operative Dentistry, Diagnosis and Extraction, Orthodontics, Dental Prosthetics, Anæsthetics, and Radiography by specially appointed Clinical Teachers. All the courses of instruction are open to women students. Copies of the prospectus may be obtained on application to the Dean.

Newcastle-upon-Tyne Dental Hospital and Sutherland Dental School

This institution is a component part of, and constitutes the Dental Department in, the University of Durham College of Medicine. A new dental hospital, erected within the grounds of the Royal Victoria Infirmary and equipped with the most modern apparatus, was opened in 1932, and it is possible to undertake the whole of the dental curriculum—i.e., systematic lectures, dental and general hospital practice, together with the mechanical pupilage—at the College. The Dental Board of the United Kingdom recognises the school for the purpose of granting its bursaries to students who are able to comply with the conditions laid down by the Board. The composition fees payable by dental students are £90 for all systematic lectures and laboratory work at the College for the B.D.S. (or £85 for the L.D.S.), £50 for dental hospital practice for B.D.S. (or £40 for L.D.S.), £16 16s. for general hospital practice, and £80 for pupilage in mechanics. A dental prospectus and any other information may be obtained from the Dean, University of Durham College of Medicine, Newcastle-upon-Tyne.

SCOTTISH TEACHING INSTITUTIONS

Edinburgh Dental Hospital and School

The Edinburgh Dental Hospital and School is located in spacious and well-equipped buildings at 30, 31, and 32, Chambers-street, and offers special advantages to dental students. The General Courses required for the Dental Diploma may be taken in the Medical School of the Royal Colleges of Physicians and Surgeons or in the University schools. The general hospital attendance and clinical instruction are taken at the Royal Infirmary. The University, Medical Schools, and Royal Infirmary are within three minutes' walk of the Dental Hospital. The special courses are taken in the hospital. The Dental Hospital practice, extending over two years, affords a student ample opportunity for a full acquaintance with every branch of dentistry. The hospital admits a limited number of indentured pupils. They receive their instruction in Mechanical Dentistry concurrently with the general and special courses. A premium of 60 guineas is payable with each such pupil. The practice and lectures of the hospital are recognised by, and qualify for, all the Licensing Boards. Those students who desire to take a Medical and Surgical Diploma in addition to the L.D.S. have in this school admirable facilities for so doing. The triple qualification of the Royal College of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow is recommended. The Higher Dental Diploma (H.D.D.) of the Royal College of Surgeons affords an opportunity of obtaining a higher qualification subsequent to registration. The Prospectus, with full information, may be obtained by application to the Dean or the Assistant Secretary.

Incorporated Glasgow Dental Hospital

This hospital is located at 211, Renfrew-street, Glasgow. The school is open to Men and Women Students, and Lectures are given on Dental Surgery, Operative Dental Surgery, Orthodontia, Dental Anatomy and Physiology, Dental Histology, Dental Mechanics, Crown and Bridge work, Dental Metallurgy, Dental Bacteriology, Radiology, Anæsthetics, and Dental Materia Medica. Lectures on general subjects required for Dentistry may be taken at the University or at one of the extramural schools where special provision is made for Dental Students. The new Dental Hospital is now open and is equipped with all the modern methods for teaching students. Post-graduate courses will be inaugurated during the coming winter.

Glasgow Royal Infirmary

Dental Department: The following course in the curriculum can be taken at St. Mungo's College: Anatomy, six months; Practical Anatomy, nine months; Physiology, six months; Chemistry, six months; Practical Chemistry, three months; Surgery, six months; Medicine, six months; Materia Medica, three months. Clinical Medicine (three months) and Clinical Surgery (six months) are taken at the Royal Infirmary.

IRISH TEACHING INSTITUTION

Dental Hospital of Ireland

All Dental Students who have passed their Second Dental Examination in the Royal College of Surgeons in Ireland (or an equivalent examination or examinations) are admissible to the Clinical Instruction of the Hospital. In addition to Clinical Instruction and Special Demonstrations, courses of lectures are given at the hospital on Dental Surgery and Pathology, Mechanical Dentistry, the Administration of Anæsthetics, Orthodontia, Dental Anatomy, and Dental Materia Medica, and instruction in Anæsthetics. The course in practical Dental Mechanics can be taken in the Hospital Laboratory. Post-graduate courses are given in Orthodontics. Further particulars can be obtained from the Dean, at Lincoln-place, Dublin.

The Services

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. S. G. Rainsford to be Surg. Comdr.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. M. O. Wilson retires on retd. pay.

Maj. E. C. Lang to be Lt.-Col.

TERRITORIAL ARMY

Maj. and Bt. Lt.-Col. E. W. Matthews to be Lt.-Col.

James Henry Crawford (late Capt. I.M.S.) to be Capt.

T. A. S. Kennerley and A. Houlbrooke (late Offr. Cadet, Liverpool Univ. Contgt., Sen. Div., O.T.C.) to be Lts.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. D. C. Vaughan, from Active List, to be Capt.

INDIAN MEDICAL SERVICE

Majs. to be Lt.-Cols.: P. C. Banerjee, B. Prasad, A. N. Bose, J. M. Mitchell, M G. Bhandari, N. J. Gai, and M. M. Cruickshank.

Lt. C. B. Miller is restd. to the estabt.

To be Lt. (on prob.): E. C. Rowlette.

Lt. W. J. Poole relinquishes his prob. appointment.

Medical Branch.—Flight Lt. (Hon. Squadron Leader) C. A. E. I. Brownlee relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

DEATHS IN THE SERVICES

Lt.-Col. Edmund Hassell Wright, I.M.S., retd., who died on August 13th aged 72, was a St. Thomas's student who qualified with the conjoint diplomas in 1887. He received his first commission in the Indian Medical Service in 1890 and retired with the rank of Lt.-Col. in 1910. At one time he was District Medical Officer and Sanitary Officer of the Medical School at Tanjore, Madras. He was specially interested in the tropical diseases common to Southern India, and his energetic pursuit of these and other affections of the natives of India impaired his health. On his retirement he went to Switzerland, but some three years ago returned to this country when he went to live at Woking. He had intended to write a treatise on the diseases to which he had devoted his life, but the project was never carried out.

M.D. DEGREES OF SWISS UNIVERSITIES.—The universities of Basle, Berne, Geneva, Lausanne, and Zürich grant the degree of Doctor of Medicine to "medical practitioners from other countries who are legally entitled to practise in their country of origin" under the following conditions: 1. Pursue a course of study in the final subjects of the medical curriculum, and pass a viva-voce examination in such, at the end of one academic year (nine months). 2. Prepare at the same time a thesis for the doctorate, which has to be accepted by the Faculty of Medicine towards the end of the year. The total fees (examination and diploma) amount to Fr.450 Swiss (£25). At Lausanne there is a tutor for British practitioners. At Geneva the laboratory course is so arranged that it provides the subject matter for the thesis, which is prepared during the entire stay. The candidate should make written application to the dean of the Faculty of Medicine, and further information can be obtained in this country from the hon. secretary of the Lausanne Medical Graduates' Association (Dr. Charles Franklyn, The Corner House, Queensway, Lincoln).

INDEX TO "THE LANCET," VOL. I., 1934

THE Index and Title-page to Vol. I., 1934, which was completed with the issue of June 30th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

ADDRESSES AND ORIGINAL ARTICLES

DISTURBANCES OF THE BODY TEMPERATURE *

BY C. E. LAKIN, M.D., F.R.C.P. Lond., F.R.C.S. Eng.
PHYSICIAN TO THE MIDDLESEX HOSPITAL AND THE LONDON FEVER HOSPITAL

EXACTLY 160 years ago Joseph Priestley by concentrating the sun's rays upon a red compound of mercury by means of a burning glass liberated a gas which he called Dephlogisticated Air, or oxygen as we now know it. How little did his friend, Samuel Parker, the London optician, who made and gave him this glass, a foot in diameter, divine the untold development of knowledge which would result from this simple gift!

Combustion and Heat Production: Some Elementary Considerations

When a candle burns in an enclosed space occupied by air the air loses some of its oxygen, becomes richer in water vapour and carbon dioxide, and also becomes hotter. This latter fact is simply an example of the universal law that no change, chemical or physical, can take place without energy being either absorbed or liberated in the process. In the example we have chosen energy is set free in the form of light and heat. Even when iron rusts a little heat is produced, but so slowly that it is dissipated before it can heat the iron. Similarly, when we breathe in air the oxygen is taken up by the hæmoglobin of the blood and carried to the tissues where the oxygen joins with the protoplasm of the tissue cells, with the result that the heat accompanying this chemical change is sufficient to keep our bodies warm even on a cold day. To continue the comparison, the air we breathe out is warmer and more moist and contains less oxygen and more carbon dioxide than the air we breathe in. If this was all that happened the cell protoplasm would soon become deprived of its carbon, but there is a constant supply of fuel in the form of carbon compounds arriving from the alimentary tract derived from the food we eat. The large complex molecules contained in food are broken down in the process of digestion into simpler constituents which, after absorption, are built up into the protoplasm of cells where, again by a process of oxidation, they provide a constant supply of heat and energy. This cellular activity we speak of as metabolism. In states of heightened metabolism more heat is produced, while in conditions of lowered metabolism the production of heat is lessened. The functional activity of the thyroid and adrenal glands plays a further part in influencing metabolism and heat regulation. It may be said that energy is used up every time a muscular action is performed, every time the stomach digests or the brain thinks.

But the generation of heat within the body does not explain the fact of the body temperature being kept constantly at the same level. This fact presupposes that the amount of heat produced is exactly balanced by the sum total of the losses of heat which are constantly going on: at the surface of the body by conduction, radiation, and evaporation; from the lungs by evaporation of aqueous vapour and by the warming of the colder inspired air; in the intestinal canal by the warming of cold food or drink; and lastly, heat is lost by the warm dejecta leaving the body. Any disturbance of this equilibrium must be followed by an increase or a lowering of the body temperature. But there is another factor without which the maintenance of this equilibrium and the equable distribution of heat throughout the body would be impossible and that is the circulation of the blood. By means of this a regulation of the loss of heat may be brought about whenever necessary, the blood-supply to the skin varying as the arterioles dilate or contract under the influence of the vasomotor nerves. Whenever the external temperature would bring about too considerable a loss of heat, the peripheral arterioles contract and the circulation becomes slower and heat is thereby retained in the body; sometimes, as in shivering, the muscles are stimulated to increased action and increased production of heat results. When on the other hand the loss of heat from the surface is prevented, as occurs in a very hot room, the peripheral arterioles dilate, the heart's action accelerates, and a much greater quantity of blood flows through the skin, and the sweat glands pour forth sweat which, by its evaporation, tends to lower the temperature. At the same time the respiration is quickened and further loss of heat takes place by means of the aqueous vapour in the expired air.

Although oxidative processes are taking place in all the tissues of the body, the two chief seats of heat formation are the muscles and the glands. It has been computed that the muscles constitute more than one-half of the total weight of the soft tissues of the body, and even during rest oxidative changes are constantly occurring in them, leading to heat production and the maintenance of muscular tone. It is probable that, weight for weight, the glands are still more effective as heat producers, but they only make up about 4 per cent. of the body-weight. The liver of an adult weighs about 3 lb., and is in constant action even when digestion is not in progress. The kidneys, weighing 5 oz. each, are also in a state of constant activity, and it is said that the urine leaving them is warmer than the blood in the aorta. According to Pembrey,

> "an adult man produces about 1,700 calories in twenty-four hours when he is fasting and remains perfectly quiet in bed. The sources of this heat have been calculated. The heart during its work produces about 70 calories, and the respiratory muscles about 150 calories; the heat due to the activity of the liver and kidneys has been estimated by Tigerstedt at 368 and 74 calories respectively. The sum of these is 662 calories, so that there remains a balance of about 1,000 calories, which must be formed almost entirely in the skeletal muscles. The *minimum* production of heat in twenty-four hours by a man weighing 70 kilogrammes (11 stone) may be estimated at 1,200 calories arising from the muscles and 500 calories from the glands."[1]

It has also been computed that in a man doing a moderate amount of daily work about one-twentieth of his metabolic energy leaves the body as mechanical energy, the rest being evolved in the form of heat. Coming to the question of heat loss, it has been estimated that about 5 per cent. of the total heat loss is expended in warming the food and inspired air, about 15 per cent. in the evaporation of water and CO_2 in the respiration, and about 80 per cent. by radiation and convection and the evaporation of sweat from the skin (Starling). The proportion of the heat lost by the skin will increase very largely in the presence of a high external temperature or of an excessive heat production in consequence of violent muscular exercise.

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* The first Lettsomian lecture for 1934, delivered before the Medical Society of London on Feb. 19th. Lectures II. and III. will appear in later issues.

[1] Text-book of General Pathology. Edited by M. S. Pembrey and J. Ritchie. 1913.

It is clear that the various processes responsible for the production of heat such as muscular and glandular activity, as well as those concerned with the loss of heat such as vascular dilatation, are all under nervous control. There is, however, great diversity of opinion as to whether special centres for the regulation of temperature exist in the brain, and we shall return later to the consideration of this subject.

Means of Measuring Temperature

Galileo is said to have been the first to utilise the principle of the expansion of bodies when subjected to heat in making measurements of temperature. The year of his invention of the thermometer is given as 1603, and it was his contemporary, Sanctorius, the celebrated Paduan professor, who applied his invention to clinical medicine. Time does not permit us to go into the history of thermometry; suffice it to say that thermometers began to make their appearance in English hospitals about 1866–67, though they had been in use in Edinburgh long before, and came into general use about 1868–70. They were about 10 inches long and, as Brunton relates, so clumsy that they were carried under the arm "as one might carry a gun." Their reduction in size—in fact the invention of the pocket thermometer—was due to Clifford Allbutt (1868). One name we cannot pass over, that of Wunderlich, professor of medicine in Leipzig from 1850 to 1877, whose classical work "On the Temperature in Diseases" was translated into English and published by the New Sydenham Society in 1871. Of Wunderlich it has been said: "He found fever a disease and left it a symptom."

The means at our disposal for registering the temperature of the body are:—

(1) The *mercury thermometer*—either in the form of the clinical thermometer as we now know it or, where surface temperature is being investigated, a mercurial thermometer of special shape in which a long cylindrical bulb coiled up in one plane at right angles to the stem is applied to the skin.

(2) The *electrical resistance thermometer*. This method depends upon the alteration of the electrical resistance of a platinum wire caused by a slight increase in its temperature. The alteration in conductivity is then measured by means of a Wheatstone's bridge or may be recorded photographically.

(3) The *thermopile*. This is based upon the principle that if the junction between two dissimilar metals be warmed a difference of electrical potential is produced and a potentiometer is used to record the current changes.

The two latter methods are employed where great accuracy is desired or a continuous record is to be made.

Two other instruments are in use where the degree of humidity of the air has to be taken into account as in cases where observations have to be made on perspiration. First, there is the wet and dry bulb thermometer, consisting of two mercurial thermometers, the bulb of one being covered with a close-fitting muslin bag which is kept moist by being held in contact with a wick dipping in water. The water evaporates from the bulb at a rate varying with the degree of saturation of the atmosphere with aqueous vapour. If the air is already saturated with moisture and no evaporation is taking place from the wet bulb both thermometers will register identical temperatures. Where the difference in the temperatures of the two thermometers is great, one may regard the air as being dry. The degree of humidity of the air can then be calculated from a formula Valuable as this information is it does not give u a true idea of the cooling power of a particular atmosphere. It fails to register for instance cooling du to air movement. This deficiency is supplied by Leonard Hill's kata-thermometer, whereby the rat of cooling is measured directly. A special type o kata-thermometer, known as a Comfimeter, give an immediate indication of the cooling property o air in rooms.

Normal Daily Range of Temperature

The mean daily temperature in health is usuall said to be 98·4° F. when taken in the mouth. If th whole 24 hours be taken into account this is probabl rather too high than too low a mean. By means of th continuous readings method of recording temperatur it is found that in health the temperature of th body is highest in the evening between the hour of five and eight and lowest in the early hours of th morning. This is chiefly to be explained by th muscular activity which occurs during the day. It i questionable to what degree the increased metabolism resulting from the ingestion of food is also responsibl since a temperature curve similar to the ordinary typ has been observed in fasting men. A reversal the daily routine such as occurs in night worke leads after a few days to a reversal in the temperatu curve. When night duty is first undertaken a overpowering desire for sleep is usually experience about 4 A.M., the hour of the usual minimum. Whe a healthy person is kept in bed, the normal temperatu variations still occur but the evening maximum i not quite so high. During sleep the temperature fall This is to be attributed to the diminished activity the body whereby less heat is produced and also to th relaxation of the vessels of the skin leading to increase loss of heat. It may be said that in health the rang is approximately from 97° F. to 99° F. if the mout temperature be taken. The rectal temperature i usually ½° to 1° F. higher than the temperature a taken in the mouth.

Sustained exercise leads to an increase of bod temperature, the rise being proportional to th exertion made. It may be as much as 3° or 4° F. bu is of temporary duration, and in health is unaccom panied by any feeling of discomfort. During exercis breathing is quickened and the pulse-rate rises and i this way the body gets rid of some of its extra hea by an increase of aqueous vapour in the expired a and by sweating. The increased temperature whic occurs in spite of the increased loss of heat appea to be beneficial to the athlete in that it facilitates th dissociation of oxyhæmoglobin in the tissues, wit the further result that larger amounts of CO_2 ar evolved and the hydrogen-ion concentration tends t go up.

Temperature also varies with age. In infants a hour or two old the temperature may be as low a 93·2° F. It rises gradually during the first few day of life but the infant only slowly develops the pow of maintaining a constant body temperature, an its temperature falls as soon as it is exposed to moderate degree of cold. Heat regulation bein imperfect, a rise or fall of the body temperature i the case of an infant is of less clinical significance tha a similar change in the temperature of an adult. fit of screaming may cause a rise of several degree a fact which may cause concern if this imperfectic of heat regulation is not appreciated. It has bee found that too cold a bath or exposure to cold aft a warm bath may lower the temperature of a healthy infant from 7° to 9° F. In old age the temperature is usually subnormal. Metabolism is much less active and the power of heat regulation becomes enfeebled, so that old people are much more affected by extremes of weather.

When we consider the temperature of the surface of the body it is found that in health it varies in different parts. The temperature of the skin of the trunk is much more constant and uniform than that of the extremities. Absence of uniformity is a sign of vigour and conversely a uniform surface temperature in all parts is a sign of poor health.

In concluding this section I should like to quote from Pembrey's article (loc. cit.) on the Physiology and Pathology of Temperature, to which I am much indebted. He says:

> "There is no uniformity in the temperature of the healthy body; the temperature is not constant in health, notwithstanding the fact that it is often said to be so and clinical thermometers and temperature charts are marked with a line at 98·4° F. for the normal. The absence of uniformity is a sign of health and well-being. We are comfortable and unconscious of the fact that there are local differences of temperature, which at once becomes manifest when we place our hands in succession on the face, chest, abdomen, and foot. As soon as the external conditions, such as heat, moisture and absence of wind, become favourable for the development of a more uniform temperature of the body, discomfort and inefficiency arise. This question is one of the greatest importance in relation to the influence of climate and artificial systems of heating dwellings and work-rooms, and it is unfortunate that many authorities have overlooked the physiological aspect. In living things there is no uniformity, and all attempts to obtain uniformity in religion, politics, work, or social standing, have failed. Uniformity would mean absolute stagnation—death.
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> "The extravagant and dusty open fire is better than the closed stove or the radiators filled with hot water or steam, for it produces more variations in the temperature of the room and these act upon the skin. Changes in the temperature of the skin stimulate the nervous system, and produce a more steady growth and greater activity of the body and mind."

Pyrexia: Hyperthermia: Aseptic Fever

Before proceeding further it may be well to define the sense in which the words pyrexia, hyperthermia, and fever are used in these lectures. *Pyrexia* is used in the sense of a heightened body temperature. *Hyperthermia* signifies a high temperature produced by causes other than infection, such as, for instance, is seen in heat-stroke or pontine hæmorrhage, or after the injection of drugs such as β-tetrahydronaphthylamine. The last example will in due course be considered under the heading of aseptic fever. The term *Fever* is used in the sense of a complex response of the body to infection in which pyrexia or raised temperature is but one of the manifestations. It is essentially a response in metabolism associated with a toxic disturbance of heat regulation, and it will be shown to be due to an exaggeration of the processes by which the body normally responds to conditions which otherwise tend to lower the body temperature. Before entering upon a consideration of the underlying processes responsible for fever it will be convenient to give some attention to the subject of hyperthermia such as is exemplified in heat-stroke.

HEAT-STROKE AND SUN-STROKE

Divergent opinions have been held as to what happens in death from exposure to the sun. Some have held that this condition is not due primarily to the heat of the sun but rather to its actinic rays, maintaining that a distinction should be drawn between heat-stroke and sun-stroke. Experiments upon soldiers whose clothing was specially designed to prevent penetration of the actinic rays of the sun have disposed finally, I think, of this theory of "sun-stroke" in the strict sense of the term (Jour. Roy. Army Med. Corps, 1911, xvi., 109). That sun-stroke is a fever endemic in certain hot countries and due to a specific micro-organism is another view for which there is no convincing evidence. In some instances it would appear that cases of specific fevers have been mistaken for heat-stroke and conversely some cases of heat-stroke have been erroneously diagnosed as specific fevers. Accumulated evidence points to the fact that sun-stroke is really heat-stroke, and is a disorder of the heat-regulating processes of the body produced by the action of moist heat upon men who are working hard or fatigued and often unsuitably clothed. We have seen that even under favourable conditions muscular work may lead to a rise of temperature to 101° F. or 102° F. Where a man is exposed to a higher external temperature than the body temperature when the air is unduly moist, and especially if it is also stagnant, it becomes difficult for him to regulate his temperature by sweating. It is true that in some cases where he is unsuitably clothed loss of water from the skin has been so great that, before unconsciousness occurs, the clothing is wet with sweat, yet where evaporation from these is slow on account of high atmospheric humidity the body will not be cooled.

We know that the chemical or metabolic processes in the living organism are less active when the body temperature falls below a certain optimum, and that with increasing body temperature these processes are speeded up; in this way with increasing body temperature the production of heat is further increased, and in the case we are considering a vicious circle becomes established. The heat-regulating mechanism of the body is overwhelmed and death will occur unless the temperature be lowered. A temperature of 107·6° F. maintained for some time will coagulate the globulin of the cells, a factor which plays a part in determining death in these circumstances. A writer has well said:

> "Soldiers have been especially liable to 'heat stroke' and many lives have been lost during forced marches, when the air was hot, moist and stagnant. The conditions under which soldiers work are the most favourable for the production of heat stroke; they are unsuitably clothed, heavily laden, and march in such close order that they are surrounded by air saturated with moisture from the sweat and breath of their comrades. They march under orders, and are not free to obey the dictates of their own sensations; moreover, their pride will often make them persist in their efforts to keep up with their more efficient comrades until they fall out of the ranks and become unconscious." (Pembrey.)

The onset of heat-stroke may occur with catastrophic suddenness and death be almost instantaneous, or there may be premonitory headache, nausea, dizziness, and visual disturbance. In a case that was admitted to the Middlesex Hospital the temperature rose to 109° F., the breathing was deep and the pupils dilated, the man being quite unconscious. As he grew worse the pulse became irregular, rapid, and more feeble, the breathing more shallow and of the Cheyne-Stokes type, and he died within a few hours of admission in spite of the most active antipyretic treatment.

There are other cases spoken of as "heat-exhaustion," in which the skin is bathed with sweat, the body temperature raised though much less so than in the form just considered but in which the patient is in a condition of profound collapse. There is rarely loss of consciousness. In such cases the failure of regulation appears to be due to a weak heart and defective vasomotor control. It is difficult to determine whether the weakness of the heart is the cause or the effect of the failure to regulate the temperature, it being a well-established fact that persons with weak or diseased hearts fall easy victims to heat-stroke, while on the other hand the heart is readily injured by a high temperature and a defective supply of blood. There is usually no difficulty in distinguishing clinically between heat-stroke and heat exhaustion, but there is no clear line of demarcation between the two conditions and cases of heat exhaustion may pass on to heat-stroke. In the one condition the heat-regulating mechanism is embarrassed, in the other it is overwhelmed.

There is another condition to which passing reference may be made, known as "heat cramps," met with more especially in stokers, miners, steel-workers, and others exposed to intense heat. Cronin in 1892 was one of the first to study this condition. Spasms of sudden onset affecting successive groups of muscles of the limbs or of the abdominal wall occur intermittently over a period of 24 hours or so. They are usually attributed to the loss of blood chlorides, the loss amounting in some cases to as much as 20 g. in the 24 hours. This loss of chlorides is believed by some to be a diffusion effect of taking large quantities of water. Others, in view of the prompt benefit which results from the intravenous injection of sodium bicarbonate, regard the condition as being due to an increase in the blood of toxic elements brought about by profuse perspiration. Heat cramps may be prevented by supplying men exposed to great heat with salinized water containing from 0·25 to 1 per cent. of sodium chloride cooled to about 50° F., and salt tablets are commonly dispensed in industrial works where high conditions of temperature prevail. Cases are usually treated with saline fluids, warm baths, and rest.

I have known death to occur while a patient suffering from renal dropsy was having a hot-air bath. Such deaths appear to be due to heat-stroke. If sweating fails to take place the temperature of such a patient rapidly rises. A nurse in charge of such a patient should be told to take the temperature of the person subjected to such treatment every two minutes till sweating occurs. If no beads of sweat are seen and the temperature progressively rises the bath must be brought to an end without further delay. In a healthy person the secretion of sweat commences as soon as the temperature of the body has attained a height of 0·2° to 0·5° C., that is roughly ½°-1° F. above the normal.

In guarding against sun-stroke it is necessary to wear light loose clothing to favour the evaporation of sweat, and a good supply of drinking water must be available. On a march frequent halts must be called. The most successful treatment of sun-stroke is the internal and external application of cold water and, if available, ice. Cooling the head and effusions of cold water to the neck so that the temperature of the blood in the carotid arteries may be affected is often followed by improvement. In severe cases ice water enemata are called for, as where the circulation is depressed the application of cold to the surface may fail to be transmitted through the feebly circulating blood to the internal parts of the body. Even in cases of recovery from heat-stroke abnormal nervous symptoms may occur for years after the stroke whenever the external temperature of the air rises above a certain point.

We have seen that sun-stroke is due to inability of the body to lose heat by sweating, and before leaving the subject of heat-stroke, an experiment of Leonard Hill's is so illuminating in this connexion that it must be quoted.

> A number of healthy young men were crowded into an airtight compartment provided with necessary apparatus for sampling the air for analysis. After 44 minutes the dry bulb thermometer registered 87° F. and the wet bulb 83° F.; the CO_2 had risen from 0·04 per cent. to 5·26 per cent., while the oxygen had fallen from 21 per cent. to 15·1 per cent. Great discomfort was experienced and the skin of all was flushed and drenched with sweat. The talking and laughing of the occupants had gradually become less and finally ceased. Long before the discomfort had become extreme the oxygen percentage became so low that matches would not burn, yet the disinclination to smoke cigarettes was not noticed till some time after it was impossible to light them. On whirling the air in the chamber by means of an electric fan immediate and great relief was felt in spite of the fact that the temperature continued to rise. On turning off the fans the discomfort returned and the occupants cried out for the fans to be restarted. Hill then allowed the occupants of the compartment to breathe fresh air through tubes provided with mouthpieces piercing the walls of the chamber, but they received practically no benefit from the fresh air. The starting of the fans, however, brought relief as before. Persons outside the chamber whose bodies were cool then breathed in the vitiated air from the compartment. No discomfort was experienced, nor did they suffer from headache or any of the effects popularly supposed to be due to inspiring vitiated air.

It is clear, from this experiment, that neither the lack of oxygen nor the presence of a high percentage of CO_2 or other excreted substance has any influence on the "badness" of the air of a room. Discomfort is due to the loading up of the air with moisture, making it impossible for the occupants to lose sufficient water from the skin.

PERSPIRATION AND SWEATING

Reference may here be made to the distinction which can be drawn between perspiration and sweating. By perspiration, or insensible perspiration as it is called, is meant the escape of water vapour by osmosis through the skin. It is thought that the sweat glands play no part at all in this process. The amount escaping will be proportional to the heat production of the body and to the external temperature, will be greater when the air is dry and less if the air be stagnant. It is diminished in places where the skin contains much fat and is not greatly influenced by alterations in the amount of fluid drunk. If the body be enclosed in a vessel through which a regulated current of air is passed and the temperature of the air be gradually raised it is found that the amount of water given off from the skin rises slowly up to a certain point and then suddenly mounts rapidly. This sudden increase is due to a new process coming into play—namely, the activity of the sweat glands. Beads of sweat appear and there is a great increase in the discharge of CO_2 from the skin. Prof. Kuno of the Manchurian School of Medicine has shown that, except in the case of the palms and soles, the sweat glands of the body are almost entirely concerned with the regulation of the body temperature. He has shown by means of absorbent paper that sweating is not uniform in different parts of the body.

Curiously enough, the palms and soles, where the sweat glands are most closely crowded, respond little if at all when the temperature of the body is raised; profuse sweating in these parts occurs in response to any intense sensory stimulation and in states of mental stress. Kuno has shown that the head, neck, dorsal and ventral aspects of the upper part of the body sweat most, while the axillæ and femoral regions participate to a slighter degree. Thus it will be seen that sweating principally occurs in those parts which by reason of their being more exposed in a hot climate offer the best opportunity for evaporation to occur. Those parts of the skin in which there is little chance of evaporation sweat least—namely, the armpit, perineal region, inguinal and femoral regions. This seems contrary to our usual experience, because those parts of the body are very likely to become clammy in hot weather, but they become wet not because sweating is especially abundant but because sweat, once discharged, evaporates with difficulty.

Under normal circumstances in temperate climates the greater part of the water imbibed in the course of the day is excreted by the kidneys, a smaller portion leaving by the lungs and by the surface of the skin in the form of insensible perspiration. The amount of water lost by the lungs and by the skin is about equal and varies with the metabolism of the individual and with the temperature and humidity of the air. Benedict estimates that in the case of a man with a basal metabolism of 1700 calories 430 g. (roughly 15 ounces) are lost by the lungs and a like quantity from the skin in the form of insensible perspiration in 24 hours. The sweat is the most dilute of all the body fluids and contains 99 per cent. of water. It is, of course, hypotonic as compared with plasma, and this contributes to its efficacy as a cooling medium, since the more dilute a solution the higher is its vapour pressure and consequently the more rapid its rate of evaporation. Of its solid constituents about three-quarters consist of sodium chloride and about half the rest of urea. In cases of renal insufficiency sweat becomes more concentrated and it is said that its urea content is increased. The secretion of sweat is under the control of the sympathetic nervous system, and may be induced by warming the arterial blood flowing to the brain in the carotid arteries even when the temperature of the body is otherwise unchanged. Though usually associated with an increased blood flow in the skin capillaries sweating is not dependent upon this, for stimulation of the sciatic nerve results in sweating in the leg in spite of the fact that vasoconstriction is also produced. Moreover, the perspiration of syncope, fear, and death is associated with pallor of the skin (Bayliss).

ASEPTIC FEVER

This term has been employed to denote the pyrexia which results when certain chemical substances are introduced into the body either by ingestion or injection. Among such substances may be mentioned β-tetrahydronaphthylamine, dinitro-o-cresol (the drug recently introduced for the treatment of obesity), atropine, cocaine, caffeine, and the injection intravenously of very strong sugar solutions. Another form of what may be termed aseptic fever is sometimes seen in prolonged thyroid feeding. If a few milligrammes of β-tetrahydronaphthylamine (which we may abbreviate to T.H.N.) be injected into an unanæsthetised rabbit (Elliott: Jour. of Physiol, 1912, xliv., 374) and the animal be examined after the lapse of half an hour, its temperature is found to have risen, respiration is panting and rapid, there is protrusion of the eyes and dilatation of the pupils. There is erection of its fur accompanied by intense constriction of the arterioles of the skin, readily observed in the ears, which feel cold to the touch. The pyrexia and the changes in the vascularity of the skin produced by the injection of T.H.N. have been compared to the changes taking place during the rigor state of an attack of malaria, and further reference will be made to this form of aseptic fever when we enter upon a consideration of the processes underlying fever. Prolonged thyroid feeding produces an entirely different type of pyrexia, not very unlike the so-called hectic type encountered in tuberculous infections. Experimental pyrexia cannot be produced in a warm-blooded animal if the spinal cord be divided in the cervical region or the mid-brain removed.

THE TEST-MEAL IN THE DIAGNOSIS OF GASTRIC DISEASE

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THERE is at present no general agreement on either of the two principal questions which may be asked about test-meals—namely, what is the best form of test-meal to use and what information of diagnostic value may be obtained by its use. Much has recently been written by Bloomfield and Polland [1] in favour of the histamine test, but while one may agree with its theoretical advantages it appears that from a clinical standpoint the final decision should rest upon proved utility rather than upon these. If any other form of test-meal can be shown to be of more service in distinguishing a benign from a malignant gastric lesion, that one should be used in preference. We may, however, anticipate the results of this analysis to the extent of saying that the histamine test compares very favourably with its rivals in this respect.

The present paper gives the results of an attempt to compare the different types of test-meal now in use, and to assess the value of each, on the basis of some of the statistics which have recently been published. The Ewald (one hour) meal and the histamine test appear to be most popular in America, and the Rehfuss type of fractional test-meal in England. Reports on large series of patients are available on each of these, but many do not give the figures necessary to this type of analysis, so that only one suitable series for each type could be found. It is particularly unfortunate that the results recently reported from the Mayo Clinic by Vanzant et al.[2] do not contain full details of the cases. While their data for normal persons are admirably tabulated they have omitted the actual means and standard deviations of the pathological ones, so that although their method is well adapted to the demonstration of changes of acidity in disease it does not permit a critical inquiry into the diagnostic value of the Ewald meal. It appears, however, that they do not claim very much in this direction (see Comfort and Vanzant [3]).

THE DATA TO BE OBTAINED

The total information which may be obtained from a test-meal may be considered under four heads.

(1) *Examination of the resting juice.*—The value of this procedure is too well known to require emphasis here. Its value in the diagnosis of gastric carcinoma has been stressed particularly by Bennett,[4] and it is sufficient to say that most physicians, at least in this country, would consider it an essential

part of the test. In the fractional and histamine tests the resting juice is first removed, and although this examination can easily be combined with the Ewald meal, as suggested by Harrison,[5] this is apparently not the practice in America.

(2) *Emptying time, or volume of residue.*—The histamine test alone fails to give any information on this point. It is questionable whether this is a serious criticism, for the motility of the stomach under the conditions of the test-meal is well known to be extremely variable (Bloomfield and Keefer [6]) so that minor alterations are of doubtful importance. Most of the cases of early pyloric stenosis which can be detected in this way will show the presence of charcoal in the resting juice or will be demonstrated by X rays.

(3) *Presence of blood in the test-meal.*—Traces of blood are a normal finding in the histamine test, and although of greater significance in the fractional test are easily produced by trauma. Gross hæmorrhage will be detected by any test.

(4) *Height of acidity reached.*—Most recent publications have been concerned with this point almost exclusively, and sufficient figures have now been published to warrant a first attempt at comparing the three methods in this respect.

Degree of Acidity and Deductions to be Drawn from it

The basis of this branch of test-meal diagnosis rests upon the association of hyper-acidity with peptic ulcer, and of hypo-acidity with gastric cancer. These associations appear to be best explained by the theory of Hurst,[7] who postulates the existence of a "hypersthenic gastric diathesis" prone to peptic ulcer, and a "hyposthenic gastric diathesis" prone to gastric cancer,* but an alternative explanation of the frequency of hyper-acidity in peptic ulcer is concerned with the theory of duodenal regurgitation (Boldyreff,[8] Bolton and Goodhart [9]). This is a much disputed point which I have discussed elsewhere,[10] but it need not be considered here as it will not affect the subsequent arguments.

(*a*) *Demonstration of achlorhydria.*—The significance of achlorhydria varies with the type of test-meal, but there is now almost general agreement that histamine should be used if the demonstration of achlorhydria, or the presence of Castle's intrinsic factor, is the principal object of the examination. This is both because pure undiluted gastric juice can only be obtained in this way, and because histamine is the most powerful stimulant of gastric secretion, so that many persons who fail to secrete hydrochloric acid with gruel or alcohol produce average amounts with histamine.

(*b*) *Significance of different levels of acidity.*—It is generally agreed that absolute indications are rarely forthcoming, but that the matter resolves itself into one of relative frequencies. I am not, however, aware of any previous attempt to express these frequencies in numerical terms or to compare the usefulness of different test-meals in this way. Certainly the existing data are all too scanty to permit any very great accuracy in these calculations, but they may nevertheless give comparative results, and may serve to show where further observations are likely to be of value.

One of the greatest difficulties, the lack of satisfactory normal standards, has only very recently been removed by the work of Vanzant et al.[11] on the Ewald meal, and by Polland [12] on the histamine test. Corresponding standards for the fractional test-meal are deficient, being confined to the pioneer work of Bennett and Ryle,[13] Baird, Campbell, and Hern,[14] and Apperly and Semmens.[15] These refer to healthy medical students, mostly male and within a limited age-period, so that they are not of general application.

We may now take two representative cases as a basis for discussion.

CASE A.—The patient exhibits certain symptoms and signs thought to originate in the stomach, and his test-meal shows a certain level of acidity. What is the chance of his having (i) a peptic ulcer and (ii) a peptic ulcer or a gastric carcinoma ?

The mental choice between (i) and (ii) will be largely a matter of age and clinical history. It is not an unimportant choice, for we shall see that while the test-meal may occasionally help in (i) it can never do so in (ii). There may be those who will consider these points too obvious to require mention, but let them reflect upon the large numbers of "routine" tests which are still performed in many general hospitals upon doubtful cases of dyspepsia. It happens not infrequently that the radiological examination is postponed, perhaps for reasons of economy, and a test-meal is substituted, so that it may be of some interest to calculate the chances of gaining useful information in this way.

Now the answer to these two questions obviously depends upon the following: the frequency of ulcer (x %) and of cancer (y %) in the population from which the patient was drawn; the frequency of his particular level of acidity in persons with ulcer (u %), with cancer (c %), and without ulcer (e %), and without cancer (f %). Since in the general population the incidence of ulcer or cancer is not large, we may without serious error take $e=f=n=$ % of normal persons having the required level of acidity. In certain cases this is not accurately known, and we shall have to take instead average figures from a large number of abnormal persons, excluding as far as possible cases of ulcer and cancer.

It is now easy to show that the patient's probability of having ulcer is

$$\frac{ux}{ux+n(100-x)},$$

and his probability of having either ulcer or cancer is :

$$\frac{ux+cy}{ux+cy+n(100-x-y)}.$$

Since we are in doubt as to the diagnosis, we may interpret this as meaning that the patient in (i) has a 50 per cent. chance of having a normal stomach, so that $x=50=100-x$, and our probability becomes :

$$\frac{u}{u+n}.$$

The patient in (ii) also has a 50 per cent. chance of normality and, say, equal chances of ulcer or cancer, so that $x=y=25$, and the probability is

$$\frac{u-c}{u+c+2n}.$$

If gastric (g %) and duodenal ulcer (d %) are to be considered separately, we have in (i) :

$$\frac{g+d}{g+d+2n}$$

and in (ii) :

$$\frac{g+d+c}{g+d+c+3n}$$

as the required probabilities. The difference between these figures and 0·5, the assumed clinical probability, is a measure of the contribution of the test-meal to the diagnosis. If we draw an arbitrary line at the 20 : 1 chance, as is usual in statistical work, we may say that useful information is obtained only if the calculated probability lies outside the limits 0·05–0·95. It must, however, be emphasised that 0 and 1 do not represent absolute certainties, being due partly to inadequate numbers and partly to imperfect statistical technique. In most cases the figures necessary for a fuller statistical treatment are not available.

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* For present purposes it is immaterial whether this is an inborn condition or the result of gastritis.

CASE B.—The patient has a doubtful gastric lesion, demonstrated by X rays, and his test-meal shows a certain level of acidity. What is the chance of malignancy ?

Probably no one would dispute the importance or the difficulty of such cases as this, so that an examination of the probability is of special interest. This is particularly so on account of the difficulty of deciding at operation whether an ulcer is benign or malignant. According to Stewart[16] a pre-operative diagnosis should always be aimed at. The diagnosis lies usually between gastric ulcer and gastric carcinoma, for duodenal ulcer rarely causes difficulty in radiological diagnosis. Using the same symbols and assuming a 50 per cent. chance of malignancy on clinical grounds, the probability is :

$$\frac{c}{g+c}.$$

One further calculation is concerned with the proportion of cases in which the diagnosis is likely to be helped. If, for example, 0 per cent. and 29·8 per cent. respectively of cases of peptic ulcer and normals come within the useful range of probability,

$$\frac{0}{2}+\frac{29{\cdot}8}{2}=14{\cdot}9\%$$

of our doubtful population consisting of half normals and half ulcers will be helped.

It will be noted that no mention of age or sex has been made in the above discussion. This is a necessary omission on account of the lack of data and will be referred to below. The applications of these methods to the three types of test-meal will now be considered.

THE EWALD MEAL (Table I.)

Sagal Marks and Kantor[17] gave four "Uneeda" biscuits with two glasses of water, without removing the resting juice. A single extraction was made at 45 mins. As normal standards their total figures for both sexes from ages 41–50 have been used, since they state that their percentages were almost unaffected by excluding cases of gross gastric disease.

TABLE I.—*Ewald Meal (Sagal Marks and Kantor)*

No. of cases ..	1461	46	357	41	Probabilities.		
Diagnosis ..	"Normal."	Gastric ulcer.	Duodenal Ulcer.	Cancer of stomach.	Case A. (i)	Case A. (ii)	Case B.
Relative frequency %	n	g	d	c	$\frac{g+d}{g+d+2n}$	$\frac{c+g+d}{c+g+d+3n}$	$\frac{c}{g+c}$
Achlorhydria	10	2	0	45	0·91	0·61	0·96*
Sub-acidity	20	23	3	40	0·39	0·52	0·64
Normal ..	24	26	15	10	0·46	0·42	0·28
Hyperacidity	46	49	82	5	0·59	0·50	0·09

* Probability falls within useful range.

It is apparent by inspection that no help is obtained in Case A. The only diagnostic point is the absence of achlorhydria in duodenal ulcer, and even this is of no use if the possibility of gastric ulcer arises. In Case B the finding of achlorhydria is seen to have some significance, so that 2 per cent. of ulcers and 45 per cent. of cancers will be diagnosed as cancer. This means that 23·5 per cent. of our doubtful cases will be thought malignant instead of the real figure of 22·5 per cent.

There is of course nothing new in this but it is interesting to note the sort of accuracy which may be expected. Perhaps the most important point which emerges is that in the absence of achlorhydria the test-meal contributes nothing to the solution of the diagnostic problem.

The anomalous position of gastric as opposed to duodenal ulcer may be commented upon here. The Ewald, and to a less extent the fractional test-meal, fails to reveal the hyper-acidity in gastric ulcer which in the histamine test is apparently identical with that found in duodenal ulcer. Although this might be thought an advantage in the differential diagnosis of gastric from duodenal ulcer, it is heavily outweighed by the approximation between gastric ulcer and carcinoma, which is a much more vital matter. It is interesting to note that the results recently reported from the Mayo Clinic by Vanzant et al.[2] even show a diminished acidity in gastric ulcer, although on the other hand the incidence of achlorhydria is reduced. Whatever may be the reason for this unusual finding,† it is certainly not an argument in favour of the Ewald meal.

THE FRACTIONAL TEST-MEAL (Table II.)

The data are taken from Koyihar,[18] in which the usual type of gruel meal was used. The "normal" figures are those for 311 cases of multiple diagnosis, excluding ulcer, gastric cancer, and pernicious anæmia. It will be seen that no superiority over the Ewald meal can be claimed. The only significant finding is again that of achlorhydria in Case B, and 2 per cent. of ulcers and 43·5 per cent. of carcinomas are involved. 22·7 per cent. of our doubtful population will be diagnosed as cancer instead of the true 21·7 per cent. There remains of course the advantage of examining the resting juice.

TABLE II.—*Fractional Test-meal (Koyihar)*

No. of cases ..	311	50	100	23	Probabilities.		
Diagnosis ..	"Normal."	Gastric ulcer.	Duodenal ulcer.	Cancer of stomach.	Case A. (i)	Case A. (ii)	Case B.
Relative frequency %	n	g	d	c	$\frac{g+d}{g+d+2n}$	$\frac{c+g+d}{c+g+d+3n}$	$\frac{c}{g+c}$
Achlorhydria	14·8	2	0	43·5	0·07	0·51	0·96*
Hypochlorhydria	9·9	8	1	21·7	0·31	0·51	0·73
Low normal	14·5	24	4	8·7	0·49	0·43	0·27
Normal ..	34·1	26	16	13·1	0·38	0·35	0·33
High normal	12·9	20	28	8·7	0·65	0·60	0·30
Hyperchlorhydria	13·8	20	51	4·3	0·72	0·65	0·18

* Probability falls within useful range.

THE HISTAMINE TEST (Table III.)

Polland[12] examined 988 persons, of whom 654 were found on examination to be free from any disease likely to affect the gastro-intestinal tract.

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† It may be mentioned in passing that Vanzant et al. calculate the probable error of the difference from the normal mean from the variance of the diseased population only. Although the variance of the normal population is smaller it is not entirely negligible, and it is just possible that the altered acidity in gastric ulcer might fall below the conventional level of significance if allowance were made for this. The figures necessary for the calculation are not given in their paper.

The figures in the Table refer to males of all ages. In Case A (i) 29·8 per cent. of normal persons, or 14·9 per cent. of our doubtful population, are affected; the presence of ulcer in them would be rendered very unlikely by the results of the test. In Case A (ii) the test is of no value. In Case B, 48 per cent. of ulcers and 81 per cent. of cancers, or 64·5 per cent. of our doubtful population, are helped. In the remaining 35·5 per cent. no relevant information would of course be obtained.

TABLE III.—*Histamine Test (Polland)*

No. of cases ..	384	143	46	Case A.		Case B.
Diagnosis.	Normal.	Peptic ulcer.	Cancer of stomach.			
Highest total acidity.	Relative frequency per cent.			(i)	(ii)	
	n	u	c	$\frac{u}{n+u}$	$\frac{u+c}{u+c+2n}$	$\frac{c}{u+c}$
0– 19	10·4	0	68	0*	0·77	1·00*
20– 39	5·0	0	4	0*	0·29	1·00*
40– 59	9·4	2	15	0·18	0·66	0·88
60– 79	14·4	0	9	0*	0·24	1·00*
80– 99	16·0	18	2	0·53	0·39	0·10
100–119	18·5	32	2	0·63	0·48	0·06
120–139	19·8	36	0	0·65	0·48	0*
140–159	6·5	12	0	0·65	0·48	0*

* Probability falls within useful range.

As a more qualitative deduction we may say that the cases overlap principally in the zone of total acidity from 80–119, which includes 52 per cent. of ulcers but only 4 per cent. of carcinomas. Ulcers are very rare below these limits and cancers very rare above them.

These deductions are obviously affected by errors of random sampling. A more correct approach to the problem consists in the calculation of the means and standard deviations of the acidity in cases of ulcer and cancer, when a better estimate of the distribution is obtained. This has been done in Table IV. from Polland's data. It is evidently necessary to consider separately cases with total acidity below 20, since they form a discontinuity in the data. Unfortunately only 15 cases of cancer with free hydrochloric acid are thus available for analysis, but although this number is small the assumption of a normal distribution appears to be preferable to the alternative of ignoring sampling errors.

TABLE IV.—*Histamine Test (Polland). Males with total acidity above 20 units. Calculated from Fisher's* [21] *table of the normal distribution*

No. of cases ..	15	135	
Diagnosis	Cancer of stomach.	Peptic ulcer.	—
Mean	54·3	116·9	
Standard deviation	23·6	18·8	Probabilities.
	Relative frequency per cent.		Case B.
Internal.	c.	u	$\frac{c}{u+c}$
20–40	20·0	0·002	1·000*
40–60	32·2	0·2	0·99*
60–70	15·3	0·5	0·97*
70–80	11·5	1·7	0·87
70–100	11·1	16·0	0·41
100–110	1·7	17·4	0·09
110–120	0·6	21·0	0·03 *
120–140	0·4	32·6	0·01 *
140–160	0·02	9·5	0·002*

Accepting 70–110 as the doubtful range, it will be seen that only 1·0 per cent. of cancers are likely to lie above and only 0·7 per cent. of ulcers below these limits. Expressing these in relation to the cases which fall within the useful range 1·3 per cent. of cancers and 1·1 per cent. of ulcers will be incorrectly diagnosed.

* Probability falls within useful range.

It will be seen from the Table that this method indicates a further improvement in the separation of the two diseases. 24·3 per cent. of carcinomas and 35·1 per cent. of ulcers fall within the zone of overlapping, so that the diagnosis is helped in the remaining 75·7 per cent. of cancers and 64·9 per cent. of ulcers. Further, in only 1·3 per cent. of these cancer cases and 1·1 per cent. of ulcers will the diagnosis be incorrect. Since the range from 0–20 represents a virtual certainty‡ (68 per cent. of cancers and no ulcers), we have for the whole group 92·2 per cent. of cancers and 64·9 per cent. of ulcers, or 78·5 per cent. of the doubtful population in which useful indications are obtained.

Discussion

It will be seen that this method of inquiry has demonstrated a substantial advantage of the histamine test over the Ewald and fractional tests, which were found to be of equal utility. The results may be summarised thus:—

CASE A.—(i) Histamine gives useful indications in 14·9 per cent. of doubtful cases. Ewald and fractional test of no value. (ii) No test of any value.

CASE B.—Histamine useful in 78·5 per cent. of doubtful cases. Ewald in 22·7 per cent.; fractional in 21·5 per cent. (both of these confined to achlorhydria).

These conclusions are of course based only upon the height of acidity reached and do not take into account the value of examining the resting juice and of detecting blood in the specimens. On these two points the fractional test is superior to the Ewald. The only drawback to the histamine test is its failure to demonstrate gastric motility, which is probably of minor importance

These results are strongly in support of the claims of Bloomfield and Polland, whose arguments need not be recapitulated here in detail. It is becoming more and more obvious that in attempting to differentiate between two diseases associated respectively with a high and a low gastric secretion, the most serviceable test is that which gives most information about gastric secretion as such. The histamine test is the only one in which the actual volume of pure gastric juice secreted within a measured time under the influence of a standardised stimulus is made available for direct examination.

I am therefore inclined to accept the arguments in favour of the histamine test, and also Polland's remark to the effect that further modifications of technique are not likely to be of much value. The only suggestion one can make is that further tabulation of the volumes of acid secreted (=concentration of acid × volume of juice) should be undertaken as they appear to show a wider divergence in ulcer and cancer than either volumes or concentrations alone. It also appears unwise to take the greatest 10 minutes volume as the secretion index, for it is too liable to be affected by difficulty in emptying the stomach. In the course of work now in progress on normal students, Lander and I [19] have taken instead the volume secreted from 10–50 minutes, multiplied by

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‡ According to Palmer and Heinz [22] no undoubted case of benign peptic ulcer associat [illegible] after histamine has been recorded. Dr. F. [illegible] state that he has seen such a case, pr [illegible] on. There is, however, no doubt as to [illegible] association.

1·5, to give a rate of secretion per hour. This should reduce the errors of volume estimation to one quarter.

Some opposite conclusions of Comfort and Osterberg[20] must be noted here. These workers made a direct comparison of the Ewald and histamine tests on 120 patients, and could find no advantage in the use of histamine. Their results with histamine were, however, strikingly different from those of Polland in several respects, noticeably in the greater overlapping of cancer and ulcer cases and in the difference between gastric and duodenal ulcers. Since Polland's series contains a much larger number of cases it would seem that we must accept it in preference pending further confirmation by others.

In conclusion, some obvious criticisms of the methods of calculation may be anticipated. It must be freely admitted that a number of assumptions have been made which are not strictly accurate, and that a number of relevant facts have been ignored owing to poverty of data. The inquiry may perhaps be considered to have served a useful purpose if only to expose the lack of existing knowledge on these points. The fact that the same assumptions were applied to each of the three tests still leaves some justification for drawing conclusions as to their relative value.

The principal flaws in the method lie in the following considerations :—

(1) Age and sex have been largely neglected. We now know, thanks to the work of Vanzant et al.[11] and of Bloomfield and Polland,[12] that gastric acidity decreases with age and is higher in the male sex. What are required, therefore, are detailed standards for each sex and for each decade, to include ulcer and cancer as well as normal persons. When these become available the accuracy of test-meal diagnosis will be materially increased. Polland's normal standards fulfil a long-felt want but he has not tabulated in detail the volumes of acid secreted. Since it is hardly likely that any one clinic will have sufficient material to establish satisfactory pathological standards, it is to be hoped that future publications will give full details of the age and sex of their patients so that their results may eventually be pooled.

(2) We have assumed the same distribution of acidity in doubtful carcinomas and ulcers as in carcinomas and ulcers in general. Further data are certainly necessary on this point. It has previously been supposed that the test-meal *failed* in just these cases, for malignant ulcers are frequently accompanied by the presence of free hydrochloric acid, and, as we have seen, the older test-meals cannot then give any additional information (unless of course characteristic signs are present in the resting juice). Bloomfield and Polland,[1] however, claimed to find a low output of acid in such cases by the histamine test, and certainly they have recorded many cases of carcinoma with free acid present but yet well outside their ulcer range. If this finding be confirmed the histamine test should prove of the greatest value in these cases.

The question of malignant degeneration in a simple ulcer is not so hopeful, and we can hardly hope at present that any assistance will be forthcoming in these cases, which are likely to show an acidity within the ulcer range.

(3) Only in one case has the attempt been made to allow for errors of random sampling, and this can only represent a first approximation owing to the inadequacy of the available data.

Conclusions

(1) A new method has been developed by means of which the efficacy of the test-meal in the differential diagnosis of ulcer and cancer of the stomach may be tested. This has been applied to typical data from the Ewald, fractional, and histamine tests with the results given below.

(2) The test-meal is of little value in cases of suspected ulcer.

(3) In the differential diagnosis of doubtful gastric lesions demonstrated by X rays, the test-meal may be of considerable value in a proportion of cases. This proportion is much the highest in the histamine test.

(4) The histamine test is superior to the other two. The Ewald and fractional tests are about equal except that the examination of the resting juice gives an advantage to the fractional test.

(5) The limitations and possibilities of this method of calculation are discussed, and the need for further data is emphasised.

It is a pleasure to express my thanks to Prof. E. C. Dodds for his advice and criticism.

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TETANUS TREATED WITH CURARE

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CURARE is an arrow poison used by the natives of South America to paralyse their game. They prepare it in the form of a black resinous extract from the bark of plants of the genus strychnos, which they store in gourds, earthenware pots, or bamboo sticks. A number of plants may be used in preparing the extract, and the strength of the crude preparation varies considerably in different samples. Boehm[1] found that different preparations might contain different alkaloids, most of which have a paralysing action and are typified by curarine. Their action is similar to that of the crude drug. One of them, however, curine, is a weaker poison and has an entirely different effect, for it acts upon the heart.

The chief effect of curare is to paralyse voluntary movement by blocking the passage of impulses from the peripheral nerves to the muscles. The point of action is thought to be the end-plates of the motor nerves. The voluntary muscles are first paralysed and later the respiratory muscles, death taking place from asphyxia.

The idea of using curare to control the spasms of tetanus is not new, for it is mentioned in several older medical text-books. Hunter[2] used it in a few desperate cases, but apart from this, accounts of cases in which it has been used are difficult to find.

Hartridge and West[3] have used curare to control tetany in parathyroidectomised dogs. They found considerable variation in strength of different samples and that two specimens out of seven possessed the power of removing tetany in the dog without causing paralysis. West[4] used one of these two samples in the treatment of 17 cases of muscular rigidity, resulting from diseases of the pyramidal and extrapyramidal motor systems. In doses which caused no detectable weakness or loss of power there was considerable reduction of rigidity while under the influence of the drug. He suggests that some samples of curare may contain a second active principle which has a selective action in that it can abolish rigidity in certain rigid states without causing paralysis, and mentions the possibility of using curare in tetanus. These observations show that different samples of curare vary considerably both in strength and action, and the dose is therefore a question of difficulty.

The sample used in the case here described was given me by Dr. J. F. Gaskell[5] and was of the "gourd" variety. It was the most potent of ten samples whose paralysing power had been compared by injection into leeches. Doses up to 32 mg. had been given to a patient with pyramidal rigidity, and this observation formed the basis of dosage in these cases. Prof. Hartridge tested the potency of this sample for frogs and found that 0·005 mg. is the lethal dose for a frog weighing 26 g., and that it paralyses frogs from that amount to 0·0025 mg.

THE FIRST CASE

A labourer, aged 39, in the afternoon of Monday, Jan. 15th, while cutting reeds, cut the tip of the second finger of the left hand on a reed. The wound was a deep one. He treated it by soaking it daily in hot water. On Monday, Jan. 22nd, he found difficulty in opening his mouth, and his throat felt stiff on swallowing. On the 23rd the stiffness of the jaw and the difficulty with swallowing were much worse and he had spasms of pain in the neck and back. On the 24th all these symptoms were worse, and he was admitted to Addenbrooke's Hospital at 1 P.M.

State on admission.—Severe spasm of masseters. Risus sardonicus. Back arched and rigid, abdomen boardlike. No relaxation between spasms. Some stiffness of arms and legs but no local tetanus. Whitlow of tip of second finger of left hand, fluctuant and full of pus. Scar of wound on lateral aspect of finger. No œdema of hand or lymphangitis. No teeth present in upper jaw.

Treatment on admission.—200,000 units of antitoxin were given intravenously and 2000 subcutaneously on either side of the infected finger. Half an hour later the whitlow was incised and washed out with hydrogen peroxide. No further antitoxin was given.

Progress.—Spasms began shortly after admission and increased rapidly in severity. By the evening the patient was having severe spasms which were brought on by the slightest sound or movement, and these occurred every minute or so. Opisthotonos occurred during the spasms, the back was rigid and arched between spasms, and the abdomen boardlike.

The sedatives used during the course of the illness were avertin and paraldehyde given rectally and occasional small doses of morphia. 7·3 c.cm. of avertin (full dose for basal anæsthesia) was given every night for eight nights. From three to five drachms of paraldehyde were given rectally dissolved in normal saline every day for ten days. Food in the form of glucose lemonade, milk, and egg and milk were given hourly when the patient was awake. The fact there were no teeth in the upper jaw made feeding a good deal easier.

By Jan. 26th, however, the spasms were getting more frequent and severe, and the patient was showing signs of exhaustion. Treatment with curare was therefore begun. Four doses of 32 mg. were given subcutaneously at six-hourly intervals beginning at midday on the 26th. Within two hours of starting this treatment the spasms were less severe, the rigidity of the arms and abdomen was less, and the spasm of the masseters was less, so that feeding was made a good deal easier. The patient had less pain and was more comfortable. He complained of no abnormal sensations after injection and there was no evidence at any time of difficulty in breathing. The pulse-rate however continued to rise. Observations on the blood pressure and reflexes could not be made. This improvement continued for 48 hours, but on the 29th spasms and rigidity began to get worse again. He was therefore given three more injections of 32 mg. of curare at six-hourly intervals. Following this the same effects were observed and the same improvement occurred, but the pulse-rate still remained rapid. On Feb. 1st spasms and rigidity again began to get worse, and so one more injection of 32 mg. was given. Following this there was steady improvement and the spasms gradually became less and ceased on Feb. 6th. The rigidity of the abdomen and back and the opisthotonos gradually passed off and had disappeared by Feb. 17th. No abnormal symptoms were observed during convalescence, but the wasting and weakness of the forearms and legs were very marked. Before discharge on Feb. 28th the patient could walk about the ward and the central nervous system showed no abnormality. One month later he was perfectly well but for some weakness of the arms and legs.

THE SECOND CASE

The patient, a boy aged 7, on July 12th fell off his bicycle and grazed his left elbow, knees, and right heel on the road. The wounds were slight and superficial, except that on the heel which was rather deep. No treatment was given. On the morning of the 14th he seemed out of sorts and complained of stiffness of the jaw on trying to eat, and pain in the neck, shoulders, and left side of the chest. These symptoms grew steadily worse and he was admitted to hospital on the 15th.

State on admission.—Continuous rigidity of the abdomen and back with stiffness of the jaw and risus sardonicus. The stiffness was made worse by noise or manipulation, and occasional slight spasms with opisthotonos occurred. The wounds had scabbed over.

Treatment and progress.—100,000 units of antitoxin were given intravenously and the wounds were cleaned. Rigidity and spasms became more severe and frequent. At 10.30 P.M. the jaw was continuously clenched, the back arched and rigid, the abdomen boardlike, and the limbs stiff. Spasms of the most intense severity occurred every 30 seconds and were caused by the slightest sound or touch. The attempt to give water with a spoon brought on severe spasms, swallowing was impossible, and attempts to suck fluid through a tube had the same effect. Perspiration was profuse, temperature 104° F., and pulse-rate 140–50.

At 11.30 P.M. 7·5 mg. of curare were given subcutaneously. Five minutes later the spasms were less severe, the reflex excitability was less, and the limbs were less rigid. At 11.40 7·5 mg. were given; at 11.50 15 mg.; and at 12.10, 15 mg., with progressive improvement. After the last injection of curare the rigidity of the abdomen had disappeared between spasms, the limbs were relaxed, the mouth could be opened, and fluid could be sucked and swallowed without bringing on spasms. Reflex excitability had almost disappeared, and the arms and legs could be manipulated freely. Only occasional slight spasms occurred throughout the night. At 1 A.M. there was some respiratory difficulty, but this improved. The pulse, however, grew weaker and more rapid, and the temperature rose steadily to 108° F. at 5.30 A.M. The respiration then began to fail and the child died at 6.20 A.M.

DISCUSSION

These cases of tetanus are 2 of a series of 19 cases I have treated during the last six years. Of the 19 patients 11 recovered. All of them, including the two which received curare, were treated on the same general lines, each being given a large dose of antitoxin by the intravenous route as early as possible and before the wound had been touched. The first case treated with curare and described above was certainly the most severe of those which recovered.

In both cases here described, curare seemed to reduce the continuous rigidity of the limbs, abdomen, and jaw muscles, to lessen reflex excitability, and to lessen the frequency and duration of the spasms. In Case 2 the severe spasms, induced by attempting to suck fluid and even by the sight of fluid, were stopped and swallowing was made possible. In Case 1, in which the dose was relatively small, the action of the drug was first apparent about two hours after the first injection. The effects appeared to last about forty-eight hours. In Case 2 the effects first appeared five minutes after the injection.

It is possible that in Case 1 the action was sufficient to tide the patient over the critical period of the illness by preventing exhaustion and by allowing more food to be given. No unpleasant symptoms were observed while the drug was being given and respiration did not appear to be effected in any way. No serious after-effects were noted, though it is possible that the rather prolonged weakness and wasting of the muscles of the arms and legs may have been due to the curare.

The second case was of such rapid onset (incubation period 48 hours) and intense severity that there was no chance of recovery. Treatment might have been more effective in prolonging life if it had begun a few hours earlier. Given however when rigidity was continuous, and reflex spasms of the most intense severity were occurring every thirty seconds, curare checked the spasms, stopped the reflex excitability, and made the rigidity very much less. Respiratory failure only occurred seven hours later when the heart had begun to fail.

Observations on these two cases are encouraging and confirm the suggestion that curare or its alkaloids will be useful in the treatment of tetanus. Dosage however is at present a difficult problem, and will remain so until standardised preparations are available and more is known of the particular actions of its various alkaloids.

I am indebted to Dr. Gaskell for the curare used in these cases, and for allowing me to treat Case 2, and to Prof. Hartridge for testing the potency of this sample on frogs.

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SPINAL MANIPULATION

WITH SPECIAL REFERENCE TO LUMBOSACRAL STRAIN AND BRACHIAL NEURITIS

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In a study of the methods commonly used for manipulating the spine, whether it be by the "osteopath's twist" or by the forcible movements under an anæsthetic as practised by orthopædic surgeons, one cannot help feeling that generally an unnecessary amount of force is used. This does not mean necessarily that the operator uses too much force to gain his end by his particular technique, or that no benefit accrues from such manipulation. But it seemed that it would be a great advantage if a method could be devised, which, while still effective in producing the movement, would be more pleasant to the patient and produce less reaction in the surrounding tissues. This is important, for a patient who has once been hurt naturally resists if the manipulation be attempted on a subsequent occasion. Hence we desire a movement which can be done with the minimum amount of force. Then certain parts of the spine are difficult to manipulate. Different workers, using different techniques, and many of them displaying much ingenuity, have managed to produce a movement at practically every intervertebral joint, but two regions for various reasons have always presented difficulties. These two regions are the lumbosacral junction and the first dorsal segment including the first rib. Accordingly it would be an advantage in devising any new method if such technique could embody a principle which would make it effective for those two regions.

Working in collaboration with H. Goehring of Pennsylvania I have developed a method which apparently meets the case. It is not unpleasant to the patient, does not cause much discomfort or reaction afterwards, and can be used effectively for the whole spine except the cervical region, where several other methods are in vogue. We early came to the conclusion that of all forms of forcible movements, traction or extension was the least disagreeable to the patient. In our own fingers, for example, we could produce a separation of the joint surfaces of the inter-phalangeal or metacarpo-phalangeal articulations by flexing those joints and then forcibly pushing them a little further into flexion. Such a proceeding caused considerable discomfort, whereas the same result could generally be attained by pulling on the digits, and this was not in the least degree painful.

Now most spinal manipulations rely for success on such movements as flexion or extension, rotation or twisting, or on thrusts of various kinds, and it occurred to us that, taking a lesson from what we had found in our fingers, we might try to exploit the principle of traction; but the difficulty was to be able to fix the spine at any given level.

For instance, with a patient on his back, if we took hold on of his head, one hand beneath the occiput and the other under his chin, and made traction, it was possible by giving little tugs on the head to produce movement at various levels of the cervical spine. With this procedure, however, we were not able to control the exact level at which movement took place.

A similar problem arose with respect to the rest of the spine. If the patient were on his back and we tugged on the feet, sometimes movement might take place at the ankle or the knee, very often it occurred at the sacro-iliac joints, and sometimes at the lumbars or lower dorsals. The site at which movement took place probably varied with the point of friction between the patient and the couch, and the height at which the feet and legs were held when the tug was administered, but certainly was not within the control of the operator.

Various methods and devices were tried with a view to fixing the spine at different levels while the pull was being administered. The body was put into different positions, the trunk held at varying angles to the horizontal, and straps applied in a number of ways, but nothing appeared to fulfil the purpose till the idea suggested itself that the end might be achieved if two operators took part in the manipulation. Each operator must be capable of doing either part of the manipulation, and each should know exactly what the other is expecting to do or feel. Once this absolute understanding has been established between them the method is simplicity itself.

A strong couch is required, suitably padded, and with detachable pillow, so that the patient can lie quite flat. It is essential to have the covering of the couch of some material other than leather, and for this purpose a corduroy cloth is recommended, so that the friction between the patient and the couch should be as great as possible. For a physician of average stature a convenient height for the couch will be about two feet, which is somewhat lower than couches are generally made, but it is easy to have the legs cut down to the required height.

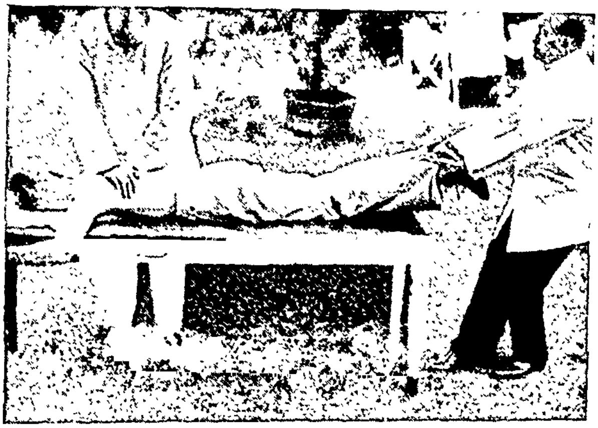

FIG. 1.—Manipulation of upper dorsal vertebræ.

The patient lies on his face, head turned to either side, and grasps the two top corners or legs of the couch, while the operator at the foot of the couch takes hold of the ankles. An assistant bends over the patient with his hands on either side of the spine, and exerts a considerable pressure vertically downwards on the patient's back at any desired level (Figs. 1 and 2). The first operator, raising the patient's feet, legs, and part of his body off the couch, gives a steady pull, and if necessary augments this with a tug. Success of this team manipulation depends on the coöperation between the two operators, and though one of them is designated the assistant, this is for purposes of description. The assistant may nod or use some prearranged signal to show that he is making his pressure. and the operator at the feet, who meanwhile has been awaiting the signal, pulls at exactly the correct instant. The assistant indicates whether the desired movement has taken place, then another attempt may be made if necessary, or a tug administered. If the assistant's pressure is made at the level of the fifth dorsal vertebra (Fig. 1), then the spine from that vertebra upwards will be fixed, so that the movement will tend to be at the articulations between the fifth and sixth dorsals. By suitably altering his hands the movement can be directed to the lumbosacral (Fig. 2), or any other level as the assistant wishes.

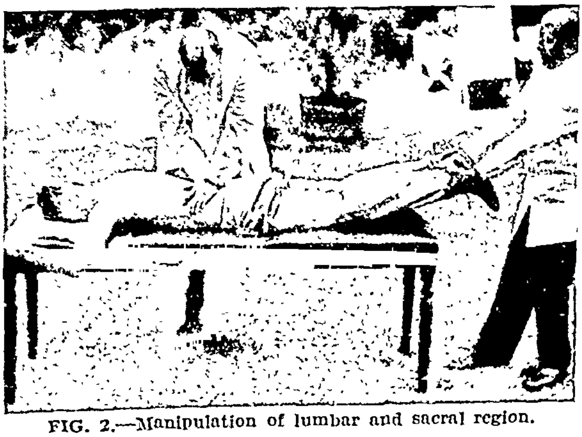

FIG. 2.—Manipulation of lumbar and sacral region.

Certain points should be noted. In this method of manipulation no loud snap takes place. There may be a soft noise, not easily heard, so the operator pulling on the ankles is generally not aware whether he has produced movement. The movement, in fact, is only slight, and only detected when the assistant is carefully watching for it. He must keep a very steady pressure and not allow his hands to slip over the patient's skin while his fellow worker makes the pull; hence it is practically impossible to carry out this treatment over a silk garment, for this slips readily under the fingers.

Another point is that in most cases only slight traction on the ankles is sufficient. The movement seems to take place almost before we are ready to appreciate it. If that is so without having the patient anæsthetised, then is it not possible that many people suffer injury to their spines as they lie stretched out completely relaxed under deep anæsthesia on the operating table, and even if they get over that ordeal, are they always treated with due respect as they are hoisted from table to trolley and from trolley to bed by people who do not realise the delicate task they are performing?

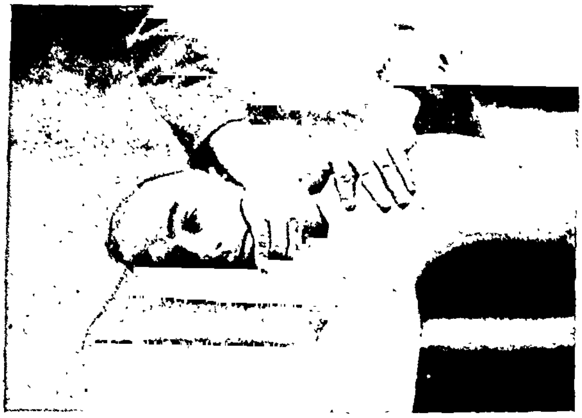

FIG. 3.—Manipulation of the left first rib, showing position of the operator's hands.

BRACHIAL NEURITIS

When we come to consider brachial neuritis certain points stand out. Along with the weariness and aching in the arm complained of by the patient, we may detect tenderness on pressure alongside the vertebral border of the scapula and in the prescapular tissues. There is often pain on pressure at the insertion of the levator anguli scapulæ, perhaps spasm in the muscle itself, and not infrequently pain in the side of the neck corresponding to the insertion of this muscle. These are accompanied by limitation of movement of the scapula or of the cervical vertebræ, and various methods are adopted for freeing up these structures. But the important thing which may be overlooked is the part played by the first rib. It is not uncommon when palpating in the supraclavicular region to find the first rib sensitive and slightly more prominent than its fellow, as if pulled up on the affected side. Perhaps such a condition could be initiated by such an act as sneezing, when, owing to the peculiar attachment of the scaleni muscles, the first rib might be drawn up and cause interference with part of the brachial plexus. Accordingly, treatment should be directed to freeing-up the first rib, and this, as was pointed out, has always been one of the difficult problems.

A single operator, trying to manipulate, say, the first left rib, might proceed in the following manner. The patient lies on his face, no pillow, head turned to the left, and arms hanging down over the edge of the couch. The operator, standing on the right side, places the heel of his left hand against the angle of the rib under consideration, then with his right hand he grasps the patient's chin and rotates it as far as possible to the left and holds it in that position (Fig. 3). With his left hand he now delivers a downward thrust —i.e., in a postero-anterior direction—against the angle of the rib, and this sometimes gives the desired movement. Now this thrust is not at all pleasant to the patient, and in rough hands a great deal of pain may be inflicted without producing any beneficial result. The team technique, however, overcomes all this discomfort. The operator, taking his hold as above, draws the chin to the limit of rotation, and makes a steady pressure over the first rib, but avoids making any thrust. Then the assistant, also standing on the right side, grasps the patient round the thighs, and raises the legs, pelvis, and trunk off the table, at the same time making traction on the thighs. When the trunk is raised to a particular height a distinct movement of the rib will probably be felt, without any discomfort to the patient.

When this has been done strapping should be applied for a few days to take the weight of the arm off the shoulder. Naturally, other factors such as septic foci or dietetic errors would be sought for and corrected, but the intention of this article has been to draw attention to, and describe, a part of the treatment which is not generally understood—namely, the production of those movements which have been mentioned.

REGIONAL DISSOCIATIONS IN BLOOD PRESSURE

(CIRCULATORY ANISERGY)

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In cardiovascular physiology the centre of interest has shifted; for it is now understood that the importance of the peripheral circulation has been underestimated.[1] Using the term in its widest sense, the peripheral circulation includes not only the superficial vascular supply of the extremities, but also the vascular supply of the deep viscera. Functionally, but not topographically, therefore, it is separate not only from the heart but also from vessels directly depending upon it, such as the large arterial trunks in the limbs.

Until recent years the attention of clinicians and physiologists seems to have been directed almost solely to cardiac function and circulatory conditions in the larger arteries. This outlook is unduly centralised; it tends to reduce to a simple problem in hydraulics all the conditions, admittedly very complex, which govern the distribution of the blood throughout the organism. Some writers have even attempted to express the laws governing circulatory equilibrium in a few mathematical formulæ. The heart was regarded as the only motor organ, and the arteries were regarded as simple, elastic, inert tubes. These structures were thought to be the only ones worthy of study, and agencies concerned in propelling the blood were considered negligible. The idea of vis a tergo was so simple an explanation of the facts that it was naturally regarded as final. It left conditions in the capillaries and entire venous system comfortably obscure, but this part of the circulation constituted only a degraded reflection of the central energy derived from the cardiac pump and merited no special attention.

Interest thus became wholly concentrated upon precise laws conforming to mechanical principles supposedly controlling the circulation within the principal arteries; and the success of this conception gave it sanction, since in practice the measurement of arterial pressure was alone considered fundamental. It was soon apparent, however, that the circulation could not be satisfactorily reduced to a problem in hydraulics. It was found, for instance, that the capillaries have an active rôle, together constituting a true peripheral heart; that there are peripheral autonomous vasomotor centres; and (most important) that reflexogenic vascular regions provide for the automatic regulation of arterial pressure which operates independently of the heart in very large degree.

The attention of clinicians was simultaneously directed to the desirability of measuring venous pressure and its pathological variations and to the part played by the peripheral circulation in phenomena of shock. Lately the importance of modifications in the equilibrium of the return circulation has been stressed anew, hypotonus existing in syncope and hypertonus in acute pulmonary œdema.

From the group of facts from which these few examples are drawn it is clear that classical views on circulatory equilibrium need revision. The decentralising of the cardiovascular system was considered by one of us in a recent paper,[2] in which experimental findings were presented and the following comment was made:—

> We believe it instructive to group together the facts which we are about to present, because they all support the same idea—namely, the existence of relative autonomy of the several circulatory sectors and their mutual independence of each other, permitting simultaneous regional conditions to occur in which the blood pressure is very different, both in arterial territory and the venous system. This fact shows us not only the decentralisation which is necessary, but the necessity of accepting a regional division, local or visceral, of vascular action. These simultaneous differences or oppositions, this multiplicity of reactions and their unequal character, have been designated by us, for greater convenience, as "circulatory anisergy."

PHENOMENA OF ANISERGY

We may now rapidly review the more distinct phenomena of anisergy which we have been able to show objectively in graphs simultaneously recording, in dogs, the figures of arterial pressure in different regions; also by comparing variations in arterial pressure with concomitant variations in the calibre of a visceral artery (the retinal artery, viewed with the ophthalmoscope); and still further by comparing tracings showing arterial and venous pressures.

The first procedure consists in comparing variations in general arterial pressure, as recorded at the central end of an artery, with those occurring at the same time in recurrent arterial pressure. The so-called "recurrent" pressure is that obtained by the aid of a cannula introduced into the peripheral end of an artery. The cannula, connected with an ordinary kymograph, measures the blood pressure maintained in the peripheral part of the limb through the existing anastomoses. This local pressure evidently reflects most notably the peripheral vasomotor actions present, but it reflects other conditions as well, since it communicates by the anastomoses with the general pressure, upon which it consequently must depend in some degree. Curiously enough François-Franck, who used this technique, rejected it for this very reason, saying that "the peripheral segment of the artery presents pressural variations which are the same as those present in the general arterial pressure, on account of anastomoses, which render the peripheral system merely a diverticulum of the aortic system." It seems to us that this difficulty may be easily overcome and all sources of error avoided if the interpretation of variations in the recurrent arterial pressure be observed in relation with those in the general pressure. Under these conditions all modifications in recurrent pressure which are relatively greater than the simultaneous general arterial pressure, or which occur apart from variations in the general pressure, or, a fortiori, which are inversely related to variations in the general pressure, must evidently be due to local vasomotor action.

By this method we have observed considerable differences and dissociations in regional variations in arterial pressure. During constriction, as well as during dilatation, of the peripheral vessels produced by suitable pharmacodynamic agents, the recurrent pressure has risen or fallen in a degree not in proportion with concomitant fluctuations in the general pressure. For example, in one case the variation in the recurrent pressure was five times as great as that in the general pressure. Here we stress the thought that this is no ordinary phenomenon. It might, in fact, be objected that an agent stimulating peripheral vasomotor action should, logically, modify peripheral pressure first of all and principally, affecting the general pressure in a secondary and lesser degree, and that our tracings could merely show, in a distinct manner, a fact which might be predicted by common sense.

We have shown, however, that it is possible to vary the recurrent and the general pressures, in relation with each other, in widely differing ways according to the dose of the medicinal agent, the manner of introducing it, and consequently the addition of a cardiac to a vascular effect, and especially according to the intensity with which certain vascular sectors respond. Still further, one of our graphs showed a tracing in which the recurrent-pressure curve was opposite, point by point, to the general-pressure curve. Each ascent in one was contrasted by a perfectly symmetrical descent in the other.[3] In this connexion we said, "We do not think it possible to present a more striking example of circulatory anisergy than this one, showing two arterial pressures measured in two distinctly different regions and simultaneously affected by changes occurring inversely and symmetrically."

In the second procedure ophthalmoscopic examination of the retinal artery was associated with record of the general arterial pressure. We have thus been able to show that the state of dilatation of the retinal artery is relatively independent of the degree of the general arterial pressure, whether high or low. This fact was demonstrated by various methods utilising different medicinal agents, in different doses, and in different combinations. Collaborating with Mrs. Schiff-Wertheimer, we obtained the following findings:—

(*a*) In man the subcutaneous injection of 20 cg. of acetylcholine dilates the retinal artery, even in the absence of any decline in the general arterial pressure.

(*b*) In dogs, inversely, different doses and the use of methyl-acetylcholine produced arterial hypotension persisting for a long time after cessation of dilatation in the retinal arterioles.

(*c*) Again, and as in our most striking example of peripheral circulatory anisergy shown by contrary variation in two different pressures, dilatation of the retinal artery, actively produced in the presence of well-developed arterial hypertension, constitutes a most striking splanchnic circulatory paradox. We obtained it by simultaneously or successively injecting adrenaline and acetylcholine into dogs.

These different examples justify the conclusion that arterial hypotension or hypertension and dilatation of the retinal artery are two easily dissociable phenomena.

In a third series of studies we examined comparatively variations in venous, general arterial, and recurrent pressure under various influences. The variations in the three different pressures were recorded simultaneously, the test animal being the dog. Just as we observed distinct regional dissociation in changes in the arterial pressure, we were able here to show the extreme freedom existing in reciprocal variations in the venous and arterial pressures. Under certain conditions these pressures may be totally independent of each other, rise or fall in one being unaccompanied by any modification in the other.

Loeper, Lemaire, and Patel have previously reported similar facts.[4] They showed that during a period in which arterial pressure rises in the normal dog under the action of adrenaline or falls in dogs previously treated with yohimbine, the effect of adrenaline on venous pressure remains unchanged, consisting of venous hypertension, both after and before treatment with yohimbine. The phenomenon which we observed was an inverse one, but had similar significance from the viewpoint now concerning us.[5] In exploring the peripheral circulation we observed that adrenaline either raises venous pressure or leaves it unaffected, according to whether the vagi are intact or divided, while the general arterial and the recurrent pressures are considerably raised in all cases. The same result is produced by using atropine instead of vagal section.

Consequently the two examples selected show total absence of parallel action in variations, in no wise reciprocal, occurring in arterial and venous pressures.

True, the causation of the pressural variations is here more complex, the venous pressure being closely related to the cardiac output. Whatever the intimate mechanism of the phenomenon may be, however, and even if the peripheral vascular factors are not the only ones present, it is none the less suggestive to show objectively that the arterial and venous pressures are in fact mutually independent under certain conditions. This fact particularly emphasises the relative autonomy of the return circulation and the importance of examining it.

These data usefully supply precise facts and concrete examples supporting a new view of circulatory equilibrium. This newer conception tends to become ever more widely extended, but is too often considered only in a vague and general way. The applications of these theoretical ideas are very extensive in clinical practice. Before rapidly reviewing these applications and to avoid any exaggerated interpretation of the tendency just mentioned, we disclaim any suggestion that examination of the heart and of its functional condition and measurement of blood pressure are no longer of value. On the other hand, we do not think that these factors supply all the data which are important as to the condition of the cardiovascular apparatus, as hitherto considered. In fact, one of us combated this exclusive view long ago in calling attention to the clinical importance of measuring peripheral venous pressure. As present ideas trend, they only confirm the sound basis of this view, which is by no means new.

CLINICAL APPLICATIONS

A knowledge of the regional dissociations in blood pressure, both in the arterial and the venous systems, allows of many deductions of pathological and diagnostic value.

1. *Pathological inferences.*—There is no need to recall the many pathological conditions modifying, within a limited vascular territory, the local arterial condition by vasomotor action occurring in different directions, but localised within a limited region. In the peripheral domain, erythromelalgia and Raynaud's syndrome constitute the two most representative examples. Although more difficult to recognise, deep and visceral vascular spasm limited to restricted areas is becoming more generally known. Some of the grave disturbances present in ophthalmology and otology are assigned to localised vasoconstriction. A case of lead colic recently published by one of us [6] should probably be interpreted as an effect of localised hypertension not affecting general blood pressure.

In neurology the growing importance of spasm limited to the cerebral arteries in causing motor effects, of deficiency or of stimulation, is a familiar fact. Four cases recently reported to the Société médicale des Hôpitaux de Paris by de Gennes [7] and by Pagniez, Plichet, and Decourt [8] show decisively the rôle of localised vascular spasm in producing subpermanent epileptic attacks, and also show the possibility of abolishing the spasm by means of acetylcholine. Finally, are not anisergical conditions in the greater and lesser circulation causative of certain forms of pulmonary œdema or infarct, of certain forms of syncope and even of some of the cases of cardiac failure, as reported by Lian, Laubry, and Tzanck, Gallavardin and Dumas?

2. *Diagnostic inferences.*—From these experimental and clinical examples an important practical idea follows—namely, that one cannot depend upon measurement of the arterial pressure in a large artery of a limb to ascertain the general state of the circulation. We do not minimise the primary importance of this measurement, but suggest that large inferences from data so obtained may be inappropriate. Findings in one part of the body are not necessarily applicable to the whole of it, as is too often assumed. Such generalisation implies uniformity in the vascular system, whereas all the facts presented here show there is a great deal of regional variation in the circulation.

One might, of course, go so far as to say that the measurement of blood pressure is valid only for the arterial sector examined. This is by no means our opinion. We nevertheless call attention to the fact that the degree of pressure present in the brachial artery is valueless for indicating the pressure present in a visceral territory, or even in the arteries of the fingers. We have emphasised the complexity of the various factors concerned in circulatory equilibrium. These factors appear largely autonomous, each with respect to the others and with respect to the heart. If this be true, it is easily evident that the knowledge of a single one of the entire group of factors, such as the degree of pressure present in the larger arteries, is not sufficient to supply information about the entire circulatory system.

Such are the conclusions derived from the experimental studies just reviewed. These studies show the relative independence of function in the different elements of the circulatory system. They reveal this system as an infinitely complex whole, in which the various parts operate in different ways.

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THE TREATMENT OF DEAFNESS

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Strange as it may appear, there is no body of persons qualified to interpret an aurist's prescription for a deaf patient, and to supply the appropriate deaf-aid instrument, as there are opticians able to read an oculist's prescription and to provide the spectacles specified. Just as it requires a specialist —the oculist—to ascertain the precise nature and amount of departure from normality in vision, so it requires a skilled person to ascertain the precise kind and degree of deafness from which a deaf patient may be suffering. There are types and degrees of deafness just as there are types and degrees of departure from normal visual acuity.

The reason for this difference is that the science of optics has been developing for about the last two hundred and fifty years, while the great advances in the precision of electrical instruments for amplifying and transmitting sounds have all been made since the War. Especially is this true of the refinements that enable a specialist in acoustics to interpret an aurist's prescription, and so provide the deaf person with exactly that type of instrument which will compensate or correct his or her particular kind of deafness.

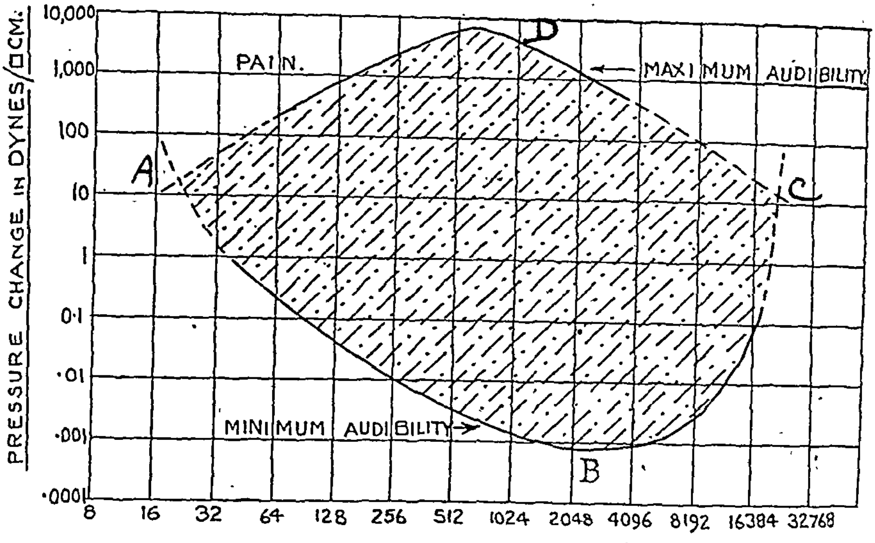
THE AUDIOMETER AND AUDITION CURVES (AUDIOGRAMS)

To understand the great advances recently made in the diagnosis and estimation of deafness we must refer to an instrument, the audiometer, by which the deaf person is tested. One of the first descriptions given in this country of the instrument was in The Lancet in 1925—"The Audiometer and its application to Medical Research" (C. M. R. Balbi: The Lancet, May 2nd, 1925). The audiometer is in essence an instrument to which one listens through an ear-piece to a series of musical notes which can be varied in frequency and intensity. In the form developed by Radio-Aid Limited it has frequencies of 125 to 4000 cycles per second in eleven and a half octaves. The intensity can be adjusted from zero to 20 units of the scale which is in absolute units of air-pressure—i.e., dynes per square centimetre.

The audiometer will undoubtedly be used universally for all hearing measurements. It is operated by merely turning a dial to select the desired note, and by turning another dial to modify the sound intensity. The patient holds the telephone-receiver close to his ear and signals when the sound being listened to is only just audible. This intensity can be recorded on a suitable chart, and it gives the threshold of audibility for the ear at this particular frequency.

From Fig. A we may learn several facts about normal hearing. In the first place we see that the range of normal audibility is through nearly 11 octaves. In the next place, it is evident that a note of frequency about 16 cycles per second is the lowest audible pitch, and that the intensity of the first audible note is of the order of ten dynes per square centimetre. Compare this with the note of about 2000 cycles frequency which can be heard when of an intensity so small as 0·0007 dynes per square centimetre. In other words, in normal hearing, the lower the pitch of the note below 2000 cycles the greater must be the intensity for the note to be heard.

FIG. A.—*Audition area for the normal ear*



Further, the curve A.B.C., which is the graphic expression of the threshold of *minimum audibility*, shows that notes of all pitches below the intensities marked on this curve are inaudible.

The upper limit of hearing, or *maximum audibility*, as expressed by the curve A.D.C. requires some explanation. This curve does not mean that notes of intensities greater than those on the curve are inaudible but that such notes have acquired a loudness which renders them disagreeable as music or unintelligible as speech.

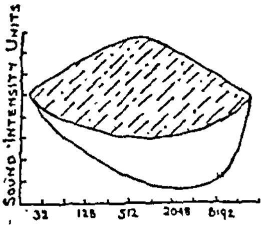
Notes of extreme intensity are believed to be the means of reflexly inducing the stapedius muscle to go into a state of spasm whereby the stapes is jammed in the fenestra ovalis and so prevented from vibrating in unison with the membrana tympani. This reflex action is regarded as a protective mechanism whereby injurious violence on the part of the stapes is prevented. The condition of spasm of the stapedius has been likened to pin-point contraction of the iris in an excessively bright light which is also a protective mechanism.

At all events, extremely loud notes are very disagreeable æsthetically so that the region beyond the curve A.D.C. has been called that of "auditory pain." It clearly corresponds to painfully bright lights which blind the eye and convey no intelligible visual information whatsoever.

EXAMINATION OF PATIENTS

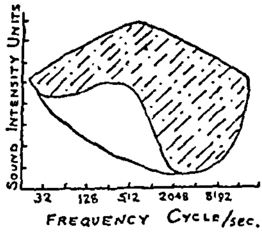
Suppose that we have tested a deaf patient, Mr. X, and obtained his audiometer chart (Fig. 1). It is evident that his deafness may be regarded as the *subtraction* of a certain intensity from the value of the notes as audible to a person with normal hearing. Mr. X's chart indicates some form of obstructive deafness, since it shows that his deafness is "uniform" or uninterrupted by any zones of hearing throughout the deaf area.

FIG. 1



Mr. X's audiometer chart.

FIG. 2



Mrs. Y's audiometer chart.

FIG. 3

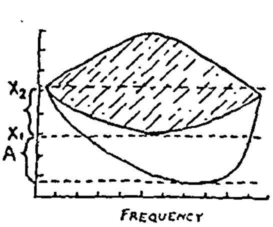


FIG. 4

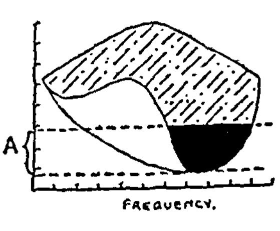


FIG. 5

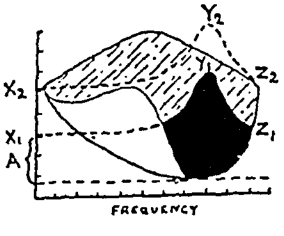
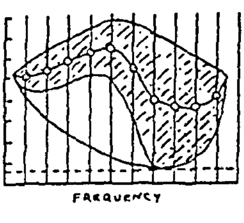


FIG. 6



An inspection of Mr. X's audiogram will also indicate that a hearing aid whose *amplification* is uniform throughout the musical scale is the kind of device applicable to his case, for we shall thus be amplifying all the notes to which Mr. X is deaf. In other words, we shall have brought his abnormally high minimum threshold of audibility *down to the normal level* so that by the deaf-aid he is enabled to *hear a sound which, without amplification, would be inaudible to him.*

Thus, referring to Fig. 3, if we amplify the intensities of the sounds by a constant amount A, a sound of intensity X_1 (just otherwise inaudible) will now be heard as though it were of the sound intensity level of X_2.

In the next place let us consider a patient, Mrs. Y, whose audiometer chart is as in Fig. 2. An inspection of her chart shows that this patient is deaf chiefly to the lower notes of the scale, but has normal hearing for the higher notes. In other words, Mrs. Y has non-uniform or irregular deafness. This region-deafness has been called "aural astigmatism" (Balbi).

Now clearly it will not do to give Mrs. Y a deaf-aid which amplifies equally at all frequencies, because if this were done she would not even hear like a normal person in her region of deafness (the lower notes), the amplication A not being sufficient, but she would perceive sounds of high frequency (black area in Fig. 4), such as squeaks and scratches, with a distressing degree of distinctness. We may refer to the black areas in Figs. 4 and 5 as "super-sensitive" areas.

If non-uniform amplification were applied (as in Fig. 5) we might intensify the notes in this region to a loudness which was more distressing still, because even sounds of small intensity at this frequency would, on account of the peaked amplification applied, be brought up to a loudness which lies within the pain-area to which we have previously referred. Mrs. Y, in fact, needs *selective or differential amplification* in which sounds only in the region of the lower notes to which she is deaf are amplified leaving unamplified the upper frequencies where hearing is normal.

This kind of amplification suitable for aural astigmatism is provided by what is known as "filter circuits" and "automatic volume control." The principle of this is that the amplification provided shall be maintained so that the intensity shall always lie half-way between the thresholds of maximum and minimum audibility for the person concerned, as indicated in Fig. 6. These electrical corrections by "filter circuits" are now made by various arrangements of capacities, inductances, and resistances. It is a highly technical affair, but the problem of differential amplification has been elegantly solved.

The principles of prescription and of differential amplification were conceived some time ago by Mr. C. M. R. Balbi, who for a number of years was honorary consultant to the National Institute for the Deaf. Mr. Balbi wishes to put the treatment of deafness on a scientific basis, and at the same time prevent deaf persons falling into the hands of the quack as has unfortunately happened so often in the past. He has, moreover, demonstrated its utility by putting the invention on a practical footing, and is successfully operating it under a Limited Company called "Radio-Aid Ltd."

However, it is obvious that it is not for any one firm or individual to organise a controlling body, so this article has been written to make the suggestion that the time has come for a concerted effort to be made to form in this country a body of "auricians" (shall we call them?) to correspond to the opticians. Opticians are registered after passing a qualifying examination; and analogously there should be a register of qualified auricians, who should organise themselves on the model of their brethren, the opticians, obtain their Charter of Incorporation, define the qualifications of membership, and in fact acquire for themselves that professional status to which they are now fully entitled.

Clinical and Laboratory Notes

AN INFLATABLE INTESTINAL BAG IN URETERO-COLOSTOMY*

By JOHN EVERIDGE, F.R.C.S. Eng.
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THE operation designed by Stiles [1] and the modifications of Coffey have given results so satisfactory as to make others hesitate to offer further modifications or additions. Grey Turner [2] demonstrated the effectiveness of the original Stiles operation in a series of 17 cases. Coffey's [3] main principle of technique differs in the method of emplacement of the ureter; he prefers to embed its length of contact within the muscular layers.

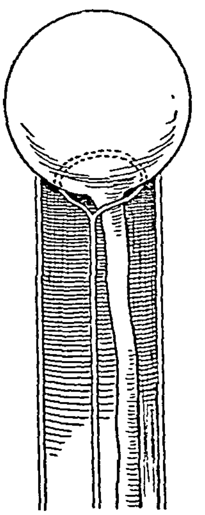

FIG. 1.—Shows bag projected beyond open end of sigmoidoscope.

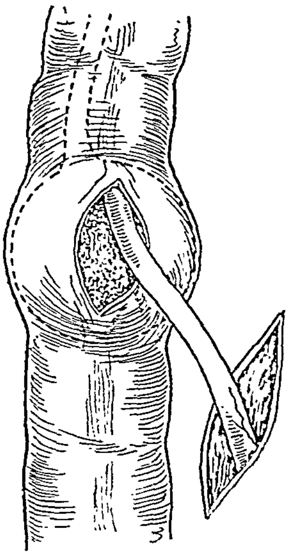

FIG. 2.—The bag in situ during Coffey No. 1 operation.

The technique now suggested has only been used in connexion with Coffey operations, and the primary reason for its introduction was to assist in that rather troublesome step, the formation of the musculo-submucous bed. Rugosity and vascularity of the bowel wall encountered as soon as the serous coat is penetrated render difficult a clean incision, since there is no firm surface to cut upon. In one of my cases I actually entered the bowel lumen before meaning to, oozing from minute vessels rendering recognition of individual layers difficult.

Material and technique.—Special material required: (1) A soft rubber bag equipped with a fairly thick-walled filling tube, at least 2 ft. in length. The bag when distended should be rather under 1½ in. in diameter. It may be stained with indigocarmine and is lubricated with liquid paraffin before introduction. (2) The introducer, an 18-in. length of rigid wire, at the distal end of which is a loop set at an angle. (3) A large graduated filling syringe—e.g., the Thomson-Walker bladder syringe.

Technique.—Having passed the sigmoidoscope to the pelvic colon, the filler tube is threaded through the loop of the introducer and the bag emptied of air. The end of the tube is clamped, and the bag is carried up beyond the open end of the sigmoidoscope and inflated with a known quantity of air. The sigmoidoscope and introducer are withdrawn, leaving the bag in situ. The proximal end of the tube and syringe are handed to an assistant to deflate or inflate, as may be necessary in the subsequent steps of the operation.

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* A note on the subject has been read before the section of urology of the Royal Society of Medicine (Proc. Roy. Soc. Med., 1934, xxvii., 951).

At the laparotomy the bag is usually found in the ideal position for the anastomosis. If not, it can easily be manipulated up or down. The remaining general steps of the operation require no separate description. References to the publication of Stiles, Grey Turner, and Coffey give full details. The bag is, of course, deflated before the sutures burying the ureter in the bowel wall are tied.

The advantages claimed are the following:

(1) By providing a firm, flat, tense surface a clean incision is more easily made the depth of which may be controlled with precision.

(2) Stretching of the bowel by the bag inflated to the optimum renders the area of incision ischæmic; only the large vessels will bleed, thus the field is less obscured.

(3) The blue stained bag shows up well and thus it is easy to recognise the smallest penetration of the mucosa.

(4) The size and disposition of the stoma may be most accurately controlled, since fixed tissues are being handled.

(5) Distension of the bag renders the operative field, and especially the region of the stoma, less liable to contamination, since fæces (from imperfect preparation) are displaced, mucus in the bowel is kept away, and the mucous coat is squeezed and flattened out. A clamp on the bowel is thus unnecessary if this technique is adopted. Should the other ureter already have been implanted infecting urine is prevented from contaminating the field.

(6) If Coffey No. 1 be adopted the needle bearing the stitch on the ureter is easily insinuated between the bag and the mucous coat and brought back through the bowel at the chosen spot and tied.

(7) If Coffey No. 2 is used a ligature is tied to the end of the catheter and threaded to a curved cutting needle, which transfixes a small knuckle of the bag allowed to collapse for the purpose. The bag is now withdrawn by traction on its tube and so the catheter, bringing the ureter neatly into position for the usual sutures.

This technique of delivery of the catheter appears simple and easier than other methods in use in Coffey No. 2—i.e., by attachment to gauze packing in the bowel, or manipulation of the catheters through a sigmoidoscope or other rigid tube, as suggested by Nitch [4] and Green-Armytage,[5] which remain in situ during the operation.

(8) If both ureters are transplanted simultaneously one or two bags may be used, depending upon the mode of implantation.

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1. Stiles: Surg., Gyn., and Obst., 1911.
2. Turner, G. G.: Brit. Jour. of Surg., 1929, xvii., 114.
3. Coffey, R. C.: Surg., Gyn., and Obst., 1927, xlv., 816.
4. Nitch, C. A. R.: Proc. Roy. Soc. Med., 1932, xxv., 1413.
5. Green-Armytage, V. B.: Brit. Jour. of Surg., 1932, xx., 130.

ADMINISTRATION OF ANÆSTHETICS TO CHILDREN DURING SLEEP

By W. R. Somerset, M.B. Edin.
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In 1902 I wrote a short note [1] on the administration of chloroform to children during sleep. Since that time I have given anæsthetics to scores of sleeping children without any of them being aware of it, and I have found this method extremely useful for nervous children.

Every experienced practitioner knows that there are many children to whom the administration of a general anæsthetic is a very serious and difficult matter. Their horror of all things medical is so deep-rooted as almost to merit the term iatrophobia. They are terrified if taken to a hospital or nursing-home, and if they are given an anæsthetic the psychological effect may be so great that the results are life-long. Consequently only operations of the most pressing character are carried out, and those which are less urgent have to be postponed or even abandoned. There are also many minor operations which would be done if only there were some way out of the difficulty, and it is for such cases that the following method is especially useful.

The child is put to bed at its usual time and receives a dose of luminal gr. ½–1. At least two hours is then allowed to elapse before anything is done, so that the child may fall into a sound sleep. Three people are required, one to give the anæsthetic, one to hold the child's hands, and a third to turn on the light. For induction I always use ethyl chloride, which is sprayed liberally on an open mask outside the room. As soon as the door is opened an assistant grasps the child's hands and the mask is placed firmly on the face. There is always a struggle, but this is of short duration and the child soon goes under. As soon as the struggling ceases the light is turned on. After ethyl chloride I follow with C_1E_2 mixture or open ether, and the rest of the anæsthetic is uneventful. Next morning the child is not questioned, but I have never known one who stated that anything unusual had happened. Some have been surprised to find their head or a limb covered with bandages, or that some teeth had fallen out, but none have shown the slightest sign of alarm, or any suspicion that an anæsthetic had been given.

I have used this method for all kinds of conditions—e.g., extraction of teeth, dressing and sewing up wounds, setting fractures, and various minor operations—with the most satisfactory results. I have often found it to be a way out of a real difficulty, and I think it might with advantage be more widely used, especially in general practice.

NEW INVENTIONS

A NEW RUBBER PROCTOSCOPE

The necessity of applying diathermy through the sigmoidoscope, as well as the usual diagnostic and therapeutic value of this instrument, has suggested a short rubber proctoscope as convenient for different practical purposes, the ordinary sigmoidoscopes and proctoscopes in general use having certain disadvantages. The rubber proctoscope (here illustrated) is handy to use, simple in construction, and can be of great service for diagnosis and diathermy rectal work. The tube, which is six inches long, is made of vulcanised rubber. It has the advantage of being less rigid and cheaper than the ordinary metal one. It can be sterilised in formalin solution as a rubber catheter. If it is boiled it softens but regains its rigidity in a few minutes. As in other proctoscopes it has the further advantage of bringing the mucous membrane nearer to the eye. The knee-chest position

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[1] THE LANCET, 1902, i., 992.

is the one of choice for introducing the proctoscope. The buttocks should be raised high to a level with the examiner's face, the shoulder low and the back well hollowed. This position helps the passage of the instrument, no inflation being required. It has also the advantage of not allowing any fluid coming from the intestine to dribble out through the instrument. Any electrical light device can be used with the instrument. The internal illumination as used in Dr. A. F. Hurst's short proctoscope, and supplied by Messrs. Down Bros., London, is very convenient for this purpose. Also the simple head mirror used by the throat specialists, or a head lamp, can be employed. In addition, many of the diathermy apparatus, now on the market, are fitted with external illumination. The commonest site for dysenteric and ulcerative conditions of the large bowel, as well as carcinoma and polypi, is within reach of the proctoscope, which may thus be of service for diagnostic and therapeutic measures.

I wish to express my thanks to the dean of the faculty of medicine, Dr. Ali Ibrahim Pasha, as well as to Prof. H. B. Day, the director of our medical unit, Cairo, for their encouragement and help. The proctoscope is supplied by Messrs. Moring and Co., 2, Soliman Pacha-street, Cairo.

M. A. ARAFA, M.R.C.P. Lond.

Kasr-el-Ainy Hospital, Cairo.

REVIEWS AND NOTICES OF BOOKS

l'Epiphyse (glande pinéale)

By Dr. JEAN CALVET, Professeur agrégé à la Faculté de Médecine de Toulouse. Paris: J.-B. Baillière et fils. 1934. Pp. 148. Fr.45.

THE mysteries of the pineal gland, which have formed a subject for speculation from the dawn of science up to the present day, are still unsolved. But it seems clear from the facts which Dr. Calvet has lucidly marshalled in this monograph, that the pineal plays an intricate part in the endocrine balance of the body, being particularly concerned with the rate of growth and sexual development. The author has been led, through his own histological and experimental observations, to suppose that the pineal body is a glandular organ and that it belongs to the endocrine system. In assembling the data which lead him to this conclusion he is at all times scrupulous in paying regard to the conflicting observations of other workers. After summarising in a series of short chapters the historical, embryological, anatomical, histological, and physiological aspects of his subject, Dr. Calvet outlines the clinical disturbances that are correlated with pineal tumours. The best known of these is the so-called Pellizzi syndrome, or precocious macrogenitosomia which occurs in childhood and is characterised by exaggerated growth, premature development of the sex glands and secondary sex characters and, inconstantly, by psychical disturbances. This syndrome is regarded by many authors as a result of pineal destruction with the consequent removal of pineal control. On the other hand, a similar kind of disturbance has been reported in cases in which the region of the mid-brain or the interpeduncular space has been occupied by a tumour and the pineal has been intact. The syndrome has not been observed when a pineal tumour is manifested in adult life. It is readily distinguished from the precocious sexual development that is associated with suprarenal tumours by the concomitant neurological signs and symptoms, and by the presence, in the suprarenal type of disturbance, of normal stature and an abdominal tumour.

A full bibliography enhances the value of this monograph.

Gonococcal Infection

By ROBERT V. STORER, M.R.C.S. London: John Bale, Sons and Danielsson, Ltd. 1934. Pp. 91. 7s. 6d.

IN writing about gonorrhœa Dr. Storer pays special attention to bacteriological diagnosis. His work is therefore more suited to the practitioner who makes his own films and his own diagnosis as to the presence or absence of the gonococcus, than for the medical man who is too busy to carry out his own bacteriology or else does not feel equipped for the task. In his preface the author states that his monograph "is intended to explain the principles which should guide the general practitioner in his management of those cases of gonococcal infection which come under his care." We doubt whether he has fully achieved this purpose. It is with the complications of gonorrhœa and with its symptoms that the general practitioner is chiefly concerned, and to these Dr. Storer gives little attention.

His book is clearly written; it is both interesting and suggestive.

Manipulative Treatment for the Medical Practitioner

By T. MARLIN, M.D., Ch.B., D.P.H., R.C.P.S. Eng., D.M.R.E., Medical Officer in Charge of the Massage, Electrotherapeutic and Light Departments, University College Hospital, London. London: Edward Arnold and Co. 1934. Pp. 133. 10s. 6d.

IN this small book Dr. Marlin sets out the technique which he has adopted successfully in various forms of manipulation, hoping that the descriptions, which are clear, terse, and accompanied by informative photographic reproductions, will lead readers to try out the movements recommended. Useful notes as to the apparatus necessary are given, and wise hints on the attire to be adopted not only by the patient but by the operator. The book closes with two interesting chapters, one setting out the reasons which should lie behind the choice of cases for manipulative treatment and the other pointing out that in spinal manipulation team technique or assisted technique may be of great value. Dr. Marlin in another place in this issue of THE LANCET (see p. 477) expounds this subject, using illustrations from his book.

The Healthy Infant

By E. R. C. WALKER, B.A. Camb., M.B., F.R.C.P. Edin., Clinical Assistant, Royal Aberdeen Hospital for Sick Children. With foreword by Prof. CHARLES MCNEIL. Edinburgh: W. Green and Son, Ltd. 1934. Pp. 137. 3s. 6d.

WHETHER it is that the modern parent prefers reading about healthy children to bringing them up, or whether it is simply that smaller families make the former diversion possible, it is certainly the case that the annual output of books concerned with the normal infant has increased enormously of recent years. Dr. Walker's little book is an admirable example of a non-technical presentation of his subject by a doctor for laymen, or more particularly laywomen. It is written clearly and pleasantly, and if much of it appears to be the emphasis of commonsense principles, it will be agreed that it is exactly the neglect of these that provides the pædiatrician with the bulk of his work. The illustrations are well chosen and reproduced. We see the hero of this saga in his bath, breaking wind, imbibing his meals comfortably and uncomfortably, and in a number of other situations dear to biographers. We do not know how Dr. Walker would face the acid test that should be applied to all professing pædiatricians—namely, the question "How many children have you got yourself?" but on internal evidence there is nothing to suggest a lack of sympathy with the difficulties of the harassed parent.

An Epitome of Obstetrical Diagnosis and Treatment in General Practice

By BETHEL SOLOMONS, M.D., F.R.C.P.I., F.C.O.G., Master, Rotunda. London: John Bale, Sons and Danielsson, Ltd. Pp. 138. 2*s.* 6*d.*

THE relatively small amount of information which this book contains severely limits its value. Dr. Bethel Solomons' use in some places of numbered lists and in others of a rather bleak narrative is rather disturbing. His short sentences are sometimes a little obscure in meaning; he would have done well to abandon them entirely in favour of tabulated information. Moreover, valuable space is occasionally wasted by the repetition of information already given in "summing up" paragraphs which are hardly required in a book which is itself a summary.

Except in one or two places the treatment recommended is in accord with that usually practised in London. We think Dr. Solomons' advocacy of non-control of the fundus in the third stage of labour is unsound, and we are sorry to see the term sapræmia appear in the section on puerperal sepsis. On some important subjects very little help is given—notably, in the chapter on general diseases in pregnancy. The section on obstetric operations is good.

Anatomy of the Rhesus Monkey

By Nineteen Authors. Edited by CARL G. HARTMAN, Department of Embryology, Carnegie Institute of Washington; and WILLIAM L. STRAUS, Jr., Department of Anatomy, Johns Hopkins University, Baltimore. London: Baillière, Tindall and Cox. Pp. 383. 27*s.*

THE macaque monkey has been fated to be the victim of research in an increasing degree in the last few years, and to a less extent has been a subject for dissection in comparative anatomy rooms. Nevertheless, so far as we know, this is the first effort to provide a comprehensive "anatomy" of the animal for the benefit of these workers. The book consists of 18 chapters, each by a different author, and covers not only the zoological status of the monkey but all the various systems which make up his body, to which Prof. Carl G. Hartman adds a chapter on housing and care. Every chapter is well and clearly written, with excellent illustrations; we hope these will be increased in number in a future edition. This is, of course, a book for specialists, but everyone working with these monkeys will find useful information therein.

Quarterly Journal of Medicine

THE July issue (Vol. III., No. 11) contains the following papers: (1) Calcinosis, by W. D. W. Brooks (London). The results of investigation of a case of this rare disease, in which calcareous deposits occur in subcutaneous and other tissues chiefly of the limbs. It appears to have a close connexion with scleroderma, and metabolic studies on a patient with this condition are also reported. A marked tendency to calcium and phosphorus retention was revealed in the case of calcinosis, but not in that of scleroderma; and histological study of a calcareous nodule from the former suggested that the calcium was deposited in degenerate fibrous tissue.—(2) A Statistical Analysis of 389 Fractional Test-meals, with special reference to Duodenal Regurgitation, by N. F. Maclagan (London). The results are opposed to the views that duodenal regurgitation is responsible for the fall in acidity in the later stages of the test-meal, and that pyloric irritation is responsible for the climbing type of curve.—(3) The Hæmopoietic Activity of the Normal and Abnormal Human Liver, with special reference to Pernicious Anæmia, by J. F. Wilkinson and L. Klein (Manchester). Liver extracts were made from (*a*) normal human livers; (*b*) from the livers of patients with pernicious anæmia undergoing active remission and dying of other diseases; from the liver of (*c*) one partially treated case and (*d*) one untreated case of pernicious anæmia; an extract was also made from the liver of a case of polycythæmia rubra, and a control extract of calf liver. Tested on patients with pernicious anæmia, the extracts in groups (*a*) and (*b*) were found to be hæmopoietically active; that in (*c*) was partially active; and that in (*d*) inactive. The extract from the liver of the polycythæmia case was unusually potent.—(4) The Alleged Pituitary Origin of the Eclamptic and Pre-eclamptic Toxæmias of Pregnancy, by F. B. Byrom and C. Wilson (London) (see p. 490).—(5) The Respiratory Exchange during Exercise in Heart Disease, by Maurice Campbell (London). The pulmonary ventilation on 16 cases of heart disease was found to be rather greater at rest, during, and after exercise than in normal subjects; also in the patients the respiration-rate was faster, and the effective alveolar ventilation formed a smaller percentage of the total ventilation. Elimination of CO_2 was less, and in spite of shallow breathing a much greater proportion of the vital capacity was called upon in the patients. This last appeared important in the production of dyspnœa.—(6) The Effects of Bodily Rest, Muscular Activity, and Induced Pyrexia on the Ventricular Rate in Complete Heart-block, by A. R. Gilchrist (Edinburgh). Investigation of a series of cases of complete heart-block showed that on exercise the ventricle was capable of substantial increase in rate in some, slight in others. A labile ventricular rate accompanied a stable auricular rate and vice versa. Pyrexia produced by protein shock also accelerated the ventricle.—(7) Massive Atelectatic Bronchiectasis, by W. P. Warner (Toronto). Five cases of bronchiectasis involving a whole lung are reported; all were due to atelectasis of the lung, congenital in 1 case, in 1 due to central bronchial obstruction, and in 3 due to the obstruction associated with infection. No fibrosis of lung parenchyma, nor pleural adhesions were present in these cases; the distinctive radiograms are reproduced.—(8) The Treatment of Muscular Dystrophy with Glycine, by D. P. Cuthbertson and T. K. Maclachlan (Glasgow). Experiments are recorded on 7 cases of muscular dystrophy and 2 of muscular atrophy to determine the effect of injected glycine. There was a temporary increase in urinary creatine in all cases, and at the same time the majority benefited generally and by improved power in the affected muscles.—(9) Prolonged Residence in High Oxygen Atmospheres, by D. W. Richards and A. L. Barach (New York) (reviewed in THE LANCET, August 18th, p. 371).—(10) Lung Abscess, with special reference to Causation and Treatment, by James Maxwell. Analysis of 315 post-mortem notes.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 1, 1934

RAIN AND STORAGE

LONDON is dependent for most of its water on two rivers, the Thames and the Lee, neither of them with very large watersheds. Nevertheless, the amount of rain that falls in any year on these watersheds would be amply sufficient to supply man, woman, and child with enough water all the year round if the rain were to fall evenly. Unfortunately, as we well know, this is not the case, and long periods of drought are not compensated by intervening periods of heavy rainfall, because the flood-water, after doing harm to low-lying crops and riverside dwellers, is allowed to reach the sea as quickly as can be arranged. The situation is described in a caustic remark from America quoted in the recent report[1] of the Metropolitan Water Board, "It soon will be four years since 'the drought of 1930' began—and it is still going strong: meantime every human effort is being put forth to shunt available rainfall off to the sea as rapidly as possible." The recent report of the Ministry of Health considers the dangers of flood in the tidal reaches of the Thames almost in the same breath as the drought higher up.

The necessity of pure water was of course not foreseen by the early settlers on the Thames estuary any more than it was in the case of the Hansa towns of North Germany which are for the most part equally badly situated for obtaining a sufficient supply. The Metropolitan Water Board is responsible for supplying a population of 7½ millions, more than equal, as HOUSTON used to say, to the combined populations of Australia and New Zealand. Each of these persons requires on the average a little more than 40 gallons of water a day, the average daily quantity of water distributed being about 293 million gallons—and still going up, for last year there was an increase of more than 28,000 in the number of premises supplied and 5 per cent. more water distributed than in the previous year. Normally of these 300 million gallons daily 200 are taken from the Thames and 50 from the Lee. The Thames should itself be sufficient for the purpose, for even last year more than 1300 million gallons of water a day passed Teddington weir; the Water Board is entitled if it wishes to take all of this except the comparatively trifling amount of 170 million gallons to keep the Pool of London flowing—and even this small obligation has been reduced to 50 million gallons in the present emergency. But the drought during the six months around last Christmas created a situation without parallel in recent times, for the rainfall was something like six inches below the average and actually only 79 million gallons passed Teddington weir on Sept. 4th and no water at all passed Feilde's weir on the Lee during two days of the same month, and only 2 millions on one December day. Obviously without some storage the position would be impossible, and it has been the policy of the Water Board since 1902 steadily to develop the storage capacity. At the appointed day in 1904 when the old water companies were amalgamated there were only the Staines reservoirs with a capacity of 3380 million gallons; Walton reservoir opened in 1907 gave another 1200 millions, King George's reservoir in 1913 more than 3000 millions, and finally in 1927 the Littleton reservoir, built two years earlier, was brought into general use, bringing up the effective storage to a total of 19,000 million gallons.

A striking illustration of the value of storage is to be found in the newly completed Sösetal dam in the Harz mountains, designed to provide a supply of drinking water for a number of important towns in the Province of Hanover, including Hildesheim and Bremen. The Harz being densely wooded and rising sharply to a height of 4000 feet out of the North German plain, induces the copious precipitation which results in devastating flooding of the river Leine, one of the large tributaries of the Weser. In January, 1932, 1500 million gallons of water fell in this small watershed within a period of 60 hours instead of so many days; 15,000 gallons per second were retained by the dam and only 700 were allowed to pass, with the result that this valley was the only one entirely unharmed by flooding. The yearly total of water entering the dam will vary in dry years (such as 1911 and 1921 were) from 6000 million gallons to 11,000 in wet years, averaging about 8000. The total content of the reservoir will be 5500 million gallons, making it possible to deliver 7000 millions in the year at a controlled rate of flow, approximately 220 gallons in the second. By keeping back flood-water and delivering a regular supply of water into the Leine, the needs of agriculture will be met all along the course of the river, while the use of the reservoir as a supply of drinking water will have no drawback, since the 2000 million gallons a year which will enter the supply pipes are no more than the flood-water which normally romps down to the sea, doing nothing but harm in its course.

These facts and figures from Hanover bring out the prime value of storage, if anyone had doubts on the point, but the advantages of storage are not exhausted by the equalisation of supply. Storage has its own virtue. It is, as HOUSTON again remarked, nature's own way of purifying water and the mere lag of water in storage reservoirs produces results of importance. The sedimentation of suspended solids carries down a large proportion of the bacteria present in the raw water; a reduction of 72 per cent. occurred last year in the Littleton reservoir. Excremental microbes are reduced by 92–97 per cent. by storage alone, and the bacteriological standard reached after filtration of the sedimented water is very high. On the other hand, storage may lead to the growth of algæ and related organisms, which clog the filter-beds, and these have not been kept entirely in check with copper sulphate. There is room here for further study of algicidal agents and indeed of the whole sequence of biological changes in river water before and after filtration. The minor problems of storage must be solved, for certain it is that only a large increase in storage capacity will prevent recurrence of the present anxious situation. If all the storage reservoirs of Thames and Lee were full there would be no more than 66·6 days' supply available. If there were a year's reserve the Water Board need not pass sleepless nights in the driest summer. The initial expense of installation would no doubt be great, but the running cost need not go up materially, and London would regain its position of premier city in the provision of healthy amenities. Moreover, every gallon of water stored in flood-time would benefit the riverside dwellers.

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[1] Twenty-eighth Annual Report, by R. B. Floris, deputy director of water examination. London: P. S. King and Son. 10s. 6d.

REGIONAL BLOOD PRESSURES

MORE and more interest is being taken in the peripheral circulation, not only in the limbs but also in the viscera. It is now recognised that there are peripheral vasomotor centres, which act apparently in independence of the heart and big vessels, and it has also become clear that the venous system plays an important part in the general circulation. In these circumstances dissatisfaction is often expressed with the present methods of measuring blood pressure, and it is realised that false conclusions may sometimes be drawn if readings from the brachial artery are taken as a guide to the state of the general cardiovascular system. It has been pointed out [1] that the pressure in the two arms may differ by as much as 10 mm. systolic and 5 mm. diastolic; E. J. STIEGLITZ and D. W. PROBST found differences of this kind in 15 per cent. of cases, and concluded, with justice, that no single reading from one arm could be considered satisfactory. Recently BRODIN and JOSEPH [2] have examined and compared the arterial tension in the legs and arms of elderly people, using a Pachon's manometer, and here again a good deal of variation has been found between the two sets of readings, the systolic pressure in the lower limbs being higher than in the upper. At the Mayo Clinic another significant inquiry on similar lines has been made by VOLDENG,[3] who has investigated the feasibility of ascertaining clinically the blood pressure in arteries of different sizes in the same subject. In normal persons of various ages mean pressures were estimated in the brachial artery, in a digital artery, in an arteriole, and in a capillary. In this normal group he found stability of the blood pressure gradient even when the effects of cold air and cold water, warm air and warm water were tested. On the other hand, when similar observations were made on ill people—including cases of essential hypertension, arterio-sclerosis, polycythæmia, and anæmia—much variation was noted. For example, in essential hypertension the resistance was found to be mainly in the arterioles; whereas in severe generalised arterio-sclerosis, although raised in the larger vessels, the pressure was actually below normal in the arterioles and capillaries. In polycythæmia the pressure in the minute vessels was found to be much reduced and it tended to return to normal as the condition of the blood improved under treatment.

It is clear again from all this work that estimates of the brachial pressure alone do not necessarily give adequate information about conditions elsewhere in the vascular tree. Prof. VILLARET, Dr. JUSTIN-BESANÇON, and Dr. CACHERA have pressed this conclusion even further, and have shown "the existence of relative autonomy of the several circulatory sectors and their mutual independence of each other, permitting simultaneous regional conditions to occur in which the blood pressure is very different." Their observations and deductions, as published in our present issue, are of no little importance in the way they bear on some of the problems of medicine, especially those associated with an arterial spasm and shock. And although they do not regard our present methods of estimating blood pressure as valueless, it is impossible to read their paper without realising that these methods leave much to be desired. The time can hardly be far distant when we shall look back on them as regrettably crude.

LESS NOISE

SINCE last Monday motorists in London have been forbidden, on penalty of forty shillings, to sound their horns after 11.30 P.M. within five miles of King Charles's statue at Charing Cross. This is the latest result of an agitation that has been going on now for some little time: in Queen ELIZABETH'S reign street noises, including horn-blowing, were forbidden in London at night on pain of imprisonment; a hundred years ago the inhabitants of a city church were complaining that the noise of stage coaches drowned the voice of the preacher. No one will readily believe, however, that the auditory sufferings of our forbears were anything to be compared with our own, and Dr. KINNIER WILSON reflects the general opinion when he says that noise "is noisier to-day than it used to be—much." [1] There is as yet no proof, he admits, that even so it is really producing neurosis; indeed it is clear that on the whole people suffer from noise because they are nervous—not suffer from nervousness because of the noise.[2] Nevertheless there are certainly such things as vicious circles, and there seem to be many weaker brethren to whom noise is an abounding source of irritation. Moreover, it has no countervailing advantage to justify its infliction on the sick and sensitive; and when the secretaries of hospitals are protesting right and left about the din outside their wards the time has undoubtedly come to deal with a genuine nuisance. Any sound made by somebody else is liable of course to be regarded as objectionable; but there are many which the majority will agree to condemn as excessive or inappropriate, and the Minister of Transport's experiment on nocturnal horn-blowing is pretty generally welcomed. If the results of similar steps in Paris and other continental cities are any guide the silent zone in London is likely to be a success and we may look forward to similar arrangements in other parts of the country.

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[1] See THE LANCET, 1932, ii., 1287.

[2] Brodin, P., and Joseph, R.: Bull. et mém. Soc. méd. hôp. de Paris, July 9th, 1934, p. 1139.

[3] Voldeng, K. E.: Proc. Staff Meet. Mayo Clin., 1933, vii., 535.

[1] THE LANCET, 1934, i., 531. Republished in the Preventive Aspects of Medicine, London, 1934, p. 229.

[2] THE LANCET, 1932, i., 995.

A second step which the Ministry has taken is the formation of a traffic noise committee with very wide terms of reference. Its personnel includes Sir **Henry Fowler**, a past president of the Institute of Mechanical Engineers, who will be chairman, and Mr. G. W. C. **Kaye**, D.Sc., and Mr. H. F. **Gough**, F.R.S., of the National Physical Laboratory at Teddington, the resources of which are to be placed at the committee's disposal by the Government. In a broadcast address on August 23rd the Minister said his object in appointing the committee was to discover the means of manufacturing motor vehicles with as silent a mechanism as possible so that noisy machines would no longer be allowed on the road. Though there are few people who would object to the average motor-car of to-day on the score of noise, a strong indictment can be framed against the average motor cycle and what is termed the sports car. The committee will clearly find plenty of material to work on if it wants to earn the gratitude of those who live on the King's highways, and the new acoustical laboratories at Teddington seem to have been erected at just the right moment. The National Physical Laboratory has for some years given close attention to the problems of measuring and abating noise, and it appears that while a noise may have several disturbing features, the actual loudness may be measured by both subjective and objective means. This is of importance because the adoption of standards of noise may have to be envisaged by the committee. Its composition should enable representatives of science and industry jointly to tackle such problems as inefficient silencers, engine noise, excessively loud or offensive hooting, the "revving up" of cold engines, and unsuitable street paving.

The action of the Ministry of Transport reflects a growing public sensitiveness to noise—a sensitiveness which has found expression in the birth of the Anti-Noise League of which Lord **Horder** is president. The League is to interest itself in much beyond disturbing sound on the roads; it is not above considering banging doors, aeroplanes, or wireless loud-speakers. In all these directions there is much to be done. From the scientific standpoint, however, the most constructive work on noise and its effects has been in relation to industry, and particularly useful data may be found in two studies published by the Industrial Health Research Board.[3] One of these suggested that even after years in a noisy environment the worker does not become completely adapted or acclimatised to noise, but goes through the process of adaptation daily. The other, by Mr. K. G. **Pollock** and Prof. F. C. **Bartlett**, F.R.S., while concluding that the psychological and physiological effects due directly to loud noise have been greatly exaggerated, agreed that in general it is prejudicial to efficiency, and found that its harmfulness is roughly proportional to the difficulty of the work on hand.

BRITISH ASSOCIATION AT ABERDEEN

The 103rd meeting of the British Association for the Advancement of Science opens at Aberdeen on Wednesday next with a presidential address in the Capitol cinema by Sir **James Jeans**, entitled "The New World-picture of Modern Physics." An evening discourse in the MacRobert Hall on the following Monday on the Storage and Transport of Food, by Sir **Frank Smith** will take the form of a memorial lecture for Sir **William Hardy**, who was president of the Association at the date of his death in January last. The proposed evening symposium on the general relation between science and the community has dropped out of the programme, and there will be no set general discussion on this topic, but anyone who gives even a casual glance at the programme of the meeting must become aware of the extent to which the Association is becoming an effective mediator between science and the public. The sectional presidential addresses are particularly designed to this end, and as we have already announced some of them bear closely on matters related both to the student of medicine as well as to the student of life in general. Prof. H. E. **Roaf** on colour vision, Dr. **Shepherd Dawson** on psychology and social problems, Dr. E. S. **Russell** on the study of behaviour, are all good evidence of this. Those who would listen to experts discussing some of the more engrossing scientific problems of the moment may attend on Friday in the section of chemistry a discussion on ascorbic acid (vitamin C), or in the combined sections of physiology and agriculture a symposium on nutrition in relation to disease. On Monday those interested in water—and who is not?—must choose between a discussion on underground water-supply, in the section of geology, and a symposium on bacteriological problems of fresh water, in the combined sections of zoology and botany. Similarly, on Tuesday morning a choice must be made between a discussion on the chemistry of milk (chemistry and agriculture combined), one on the interpretation of animal behaviour (zoology and psychology combined), and a symposium on food preservation (physiology). Probably many of those who visit the meeting for social comradeship and quiet study will want to hear Sir **Henry Fowler**'s summary on Monday morning of the report of a committee on the reduction of noise, and even to take part in the afternoon excursion to the Bridge of Dee for a demonstration of successful reduction of the exhaust noise from the motor bicycle.

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[3] Report No. 65. London: H.M. Stationery Office, 1932. See The Lancet, 1932, ii., 692.

ANNOTATIONS

ECLAMPSIA AND THE PITUITARY

THE intermediate lobe of the pituitary gland secretes a hormone, or a mixture of hormones, known as vasopressin, which exerts two very characteristic pharmacological effects—namely, vasoconstriction and postponement of the excretion of water but not salt through the kidneys. The effect of lack of this hormone, or at least of its antidiuretic moiety, is seen clinically in the picture of diabetes insipidus. Yet the clinical counterpart of excessive secretion of vasopressin, which surely must occur, has never been defined. If a pharmacologist were invited to speculate on the probable nature of this imaginary syndrome, he might well predict a rise in blood pressure and a tendency towards an accumulation in the tissues of œdema-fluid which would be rather poor in salt. In extreme cases he might foresee a degree of vasoconstriction intense enough to cause focal ischæmic necrosis in various organs. Furthermore, knowing that pituitrin combined with a high water-intake can cause convulsions in normal animals and precipitate fits in epileptic subjects, he might also anticipate convulsions. In other words, he might postulate a syndrome which would tally fairly closely with the pre-eclamptic and eclamptic toxæmias of pregnancy. It is not surprising then that the idea that these toxæmias are due to overactivity of the pituitary —by no means a novel one—is attracting considerable attention at a time when new facts about that gland are coming to light almost every week, and if the hypothesis can be translated from speculation to demonstrated fact most of the mystery surrounding eclampsia will vanish.

Such direct evidence as has so far accumulated is not entirely convincing. Prof. Harvey Cushing's [1] recent observation that the posterior lobe of the pituitary is invaded by basophilic cells from the more anterior parts of the gland in eclampsia is suggestive, but unfortunately he found the same change in two normal control glands. Many attempts have also been made to isolate pressor substances from toxæmic blood, but the technical difficulties are great, the results obtained have been equivocal, and a pressor effect is by no means peculiar to pituitary extracts. On the other hand, the antidiuretic property of pituitrin is unique, for no other known pharmacological agent will suspend excretion of water while allowing free passage of salt through the kidney. For this reason the statement of K. J. Anselmino and F. Hoffman [2] that ultrafiltrates derived from toxæmic blood cause postponement of diuresis when injected into rabbits is of considerable importance. These workers claim to have demonstrated that toxæmic blood contains a principle identical with vasopressin, in concentrations ranging from 0·002 to 0·008 units of pituitrin per c.cm. and depending on the severity of the clinical manifestations. F. B. Byrom and C. Wilson [3] have recently attempted to confirm these conclusions, but without much success. Finding that they were unable to obtain consistent results with rabbits, they employed instead a method devised by J. H. Burn [4] for the quantitative assay of the antidiuretic principle, in which the rat is used as the experimental animal; and their first step was to justify this change in technique by demonstrating that the rat method was sensitive enough to reveal the presence of pituitrin in the minimum dilution mentioned above. They then performed 38 experiments with ultrafiltrates derived from blood in 13 cases of toxæmia, but found evidence of vasopressin in only four instances, as compared with five instances in a control series of 44 experiments in which normal ultrafiltrate or saline was used as the test solution. Byrom and Wilson conclude that if an excess of pituitrin is present in the blood in eclampsia its concentration is considerably lower than Anselmino and Hoffman suggest. This does not necessarily imply that the pituitary hypothesis of eclampsia is untenable, but it suggests that further evidence is urgently needed before the hypothesis can be accepted as proven.

APTITUDE TESTS FOR MEDICAL STUDENTS

FOR some years a Committee of the Association of American Medical Colleges has been experimenting with tests for picking out those applicants who have the ability to complete successfully the medical school course. The form of the test as at present used includes seven parts: (1) comprehension and retention; (2) visual memory; (3) memory for content; (4) logical reasoning; (5) scientific vocabulary; (6) ability to follow directions; and (7) understanding of printed material. During the past year it was applied to as many as 9000 students. A detailed study of the results of this work has been made, and was presented by the secretary to the committee, Dr. F. A. Moss, at the forty-fourth annual meeting of the Association held in Rochester and Minneapolis in 1933.[1] A considerable degree of correlation is shown between success in the aptitude test and success in the medical schools. For instance, in the school-year 1929–30 the test was given to some 5000 freshmen medical students. Of the 10 per cent. who made the highest scores in the test no man failed to graduate and their average medical school grade was 86·0 for the four years' course. Of the 10 per cent. who made the lowest scores in the test, 54 per cent. failed to graduate (40 per cent. failed in the first year), and their average grade for the four years was only 71·4. On the other hand, these tests resemble those developed by industrial psychologists for detecting the accident-prone, in that while they are successful in broadly separating the sheep from the goats they cannot be confidently relied upon to place every individual in the right category. The correlation between success in the test and success in the medical school is certainly not absolute, or anything approaching the absolute. The more serious discrepancies—students who score highly in the test and do poor medical school work, and students who fail at the tests but succeed in the schools—have been specially examined by Dr. Moss. By a questionnaire addressed to the deans of various medical schools he sought to discover whether personal factors were the responsible agents. The chief reasons advanced for the unexpected failures were ill-health, financial worries, too little study, or too many outside interests. Even the best aptitude tests must "gang aft agley" when the would-be physician is "a 'play boy' with many love affairs," or is unable to resist the "social distraction" of the athletic team; while "incompatibility with certain professors" was too much of a handicap to one. The unexpected successes, on the other hand (those who did badly in the test), were composed mostly of ard workers—the "plugger type" Dr. Moss calls hem—together with students of "particularly pleasng personality" or with "close relatives who are physicians." Perhaps in future the aptitude tests might award a few extra marks for these latter haracteristics leading to unlooked-for success! Thus, although the test may be of considerable use n eliminating undesirables, yet so long as some men who do badly in it do creditable work in the schools, it is difficult, as Dr. Myers of Indiana University points out, to "convince fathers and mothers, who are interested in having their sons accepted, that this test should be used in accepting or rejecting students." Dr. Moss rightly emphasises that such a test, even if much improvement in it is found possible, can be only one criterion in selecting medical students.

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[1] Amer. Jour. Path., 1933, ix., 539.
[2] Klin. Woch., 1931, x., 1438.
[3] Quart. Jour. Med., 1934, iii., 361.
[4] Quart. Jour. Pharm. and Pharmacol., 1931, iv., 517.

[1] Published in the Journal of the Assoc. of Amer. Med. Colleges, March, 1934.

THE INCISION IN APPENDIX OPERATIONS

THE various ways of approaching the diseased appendix, and the various objections to them, are reviewed by E. H. Fiske and H. E. Rhame,[1] who point out that an ill-planned incision may cost the patient his life. The methods of exposure may conveniently be divided into (1) those in which the rectus sheath is opened by a vertical incision, with retraction of the muscle inwards or outwards as necessary, and (2) abdominal section, either oblique or transverse, lateral to the outer edge of the sheath. Fiske and Rhame condemn the rectus incisions: first because they permit of only an indirect approach to the appendix through uncontaminated tissues, and encourage excessive handling of the intestines; secondly because the drainage they allow must often be against gravity; and thirdly because they leave a scar at right angles to the line of skin cleavage, and cause injury to vessels and nerves, all of which increases the liability to post-operative hernia. With the lateral incisions, on the other hand, although many of these objections are obviated, the exposure tends to be incomplete. The incision they themselves have planned is one that allows of almost indefinite extension, either medially or laterally, depending on the findings at operation. It is slightly oblique, somewhat in the position of McBurney's, but the muscles are not split in the fashion of the gridiron. It starts from a point midway between the umbilicus and the symphysis pubis and at the outer third of the rectus, and passes obliquely outwards and upwards two fingers-breadth above the anterior superior spine—running parallel with, and one finger's breath above, the iliac crest. The external oblique aponeurosis is divided in the direction of its fibres, and the incision carried down through the internal oblique; the transversalis is split in its line of cleavage and retracted; the transversalis fascia and the peritoneum are then cut in the line of the previous incision. If necessary the incision can be carried as far laterally as the reflection of the peritoneum on to the ascending colon. Medially the fibres of the external oblique muscle can be divided by an extension of the incision in the aponeurosis, or the rectus sheath can be opened, allowing inward retraction of the rectus muscle. By vertical incision up or down the rectus sheath even wider exposure may be secured. Its authors claim that by using this incision they have lowered their operative mortality, and have also much decreased the incidence of hernia. It is unlikely, however, that surgeons in general will agree with all the premisses of the argument against the more usual methods of access. When the diagnosis of an inflamed retrocæcal or retrocolic appendix is assured, the incision must of course be made with a view to easy exposure of the outer side of the cæcum; but does not the lateral rectus incision of Battle ensure such an exposure? There do not seem to be any very good grounds for the great fear of hernia following its use, which is felt by Fiske and Rhame. The original gridiron opening did perhaps give an unduly small exposure, but as employed by many surgeons to-day it can be extended considerably at either extremity. The incision to the inner side of the rectus sheath is also popular still with many operators, although here it must be allowed they have to count on anæsthesia deep enough to render outward traction of the rectus muscle easy, and may have to make a fresh one for lateral drainage. Where special difficulties are anticipated in the operation, or where postero-lateral extension is likely to be helpful, the incision suggested by Fiske and Rhame is one to consider.

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[1] Amer. Jour. Surg., July, 1934, p. 19.

CARDIAC SYMPTOMS OF ANXIETY

IT has long been recognised that cardiovascular symptoms readily arise in the absence of organic heart disease. Such symptoms have been studied more particularly in war time, and have received the name of "irritable heart of soldiers" (Da Costa, 1871), disordered action of the heart, and effort syndrome. In the United States the term neurocirculatory asthenia is favoured because it is noncommittal, and the condition thus defined is distinguished on the one hand from organic heart disease, and on the other from psychoneuroses as such, in which anxiety, hypochondria, or hysteria predominate. Of true neurocirculatory asthenia, as thus circumscribed, the principal symptoms are palpitation, shortness of breath, precordial pain or discomfort, and exhaustion. The borderline between normal and abnormal is ill-defined, but "neurocirculatory asthenia may be said to be present when the symptoms appear during such customary physical activities and excitements of daily life as previously caused no symptoms or which in the average person produce no symptoms." This quotation is taken from a paper in which Dr. Henry C. Craig and Dr. Paul D. White analyse 100 cases,[1] and further particulars may be found in a study of the condition in its relation to organic heart disease, which Dr. White has written in collaboration with Dr. Joseph C. Edwards.[2] As in former papers he draws particular attention to the sighing respiration often complained of; indeed, "sighing respiration and precordial tenderness," he says, "are almost pathognomonic of neurocirculatory asthenia."[1] Dr. Doris Baker reported on this symptom in our columns not long ago,[3] and it has also been studied for some years by Dr. C. K. Maytum and Dr. F. A. Willius[4] at the Mayo Clinic. These last workers point out that the "sighing" may be so pronounced as to wake the patient from an apparently sound sleep—a possibility that should be kept in mind when considering nocturnal dyspnœa. They also describe attacks of panting respiration in which the rate of breathing may reach 100 a minute, and manifestations of tetany may develop through over-ventilation of the lungs.

These and other symptoms of "neurocirculatory asthenia" might strongly suggest the presence of true called in when members of such a family fall sick and if these get well the bills are sent in and duly paid. If they die as a rule the bills are not sent in. This accounts for the statement that doctors get paid while members of the family are well and not while they are sick; but the real fact is that the doctors are paid if the patients get well but not if they die." Thus it will be seen that there is substance for the popular statement of the position, while the method of remuneration is a variant of the insurance system. Dr. Wu Lien Teh closes an interesting letter with a reference to the steady publication from his bureau of the National Quarantine Service Reports, and registers his belief that medical work in China is progressive in spite of troubled political conditions.

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[1] Arch. Internal Med., 1934, liii., 633.
[2] New England Jour. Med., July 12th, 1934, p. 53.
[3] THE LANCET, 1934, i., 174 and 198.
[4] Proc. Staff Meet. Mayo Clin., May 23rd, 1934, p. 308.

WEST LONDON HOSPITAL: PROPOSED MEDICAL SCHOOL FOR WOMEN

As was briefly announced in the Students' Number of The Lancet last week a scheme for establishing a school of medicine for women at the West London Hospital is under consideration. For many years there has been a post-graduate medical college at the West London Hospital, but the approaching centralisation of post-graduate medical instruction at the new British Post-Graduate Medical School at Hammersmith has suggested to the medical staff of the West London Hospital that th[illegible] activities might be more usefully directed. It [illegible] ell known that the facilities for the instruction of w[illegible] students in clinical medicine and allied subjects a[illegible] sufficient for the present demand, and it seems [illegible] excellent idea for one more London hospital to give opportunities to women undergraduates. The proposal has not yet received the sanction of the board of the hospital, nor has any official approach yet been made to the University of London in whose province the activities of such a school would lie. The whole question is being given very careful consideration, but the announcement in the public press was premature, and no official statement has been made. The publicity given to the idea, however, should obtain both for the medical staff and lay authorities of the hospital practical arguments for the support of the scheme; and the more it is remembered that it is embryonic the more is it clear that suggestions will have a wide range within which to operate.

LEAD POISONING AND ITS RECOGNITION

Of late years there has been a revival of interest in lead as a poison. Not only have its clinical effects been reinvestigated but it has been suggested as a cause of various unexplained diseases—including, for example, nephritis in children [1] and eclampsia.[2] An understanding of the way in which the poison behaves depends on accurate means of discovering the metal and estimating its quantities in tissues and excreta. Prof. B. Behrens, of Berlin, has lately published [3] conclusions which he bases on a method of estimation devised by H. Fischer. None of the ordinary methods are, he holds, capable of giving trustworthy information about the very minute quantities of lead that one can expect to find in doubtful cases of chronic poisoning. In his experiment Behrens has used the radio-active form of the metal which enables him to estimate exactly quantities as small as 0·0001 mg. He is impressed by the [illegible] that very little is absorbed of any given dose administered by mouth; once taken up by the red blood-cells, however, lead is readily passed on to the tissues, and the bones especially form a depôt where it remains. Excretion, through intestine or kidney, is very slow, and the result is that years after absorption has ceased large deposits may remain in the bone and by suitable measures may be recovered from the fæces. In a paper on lead poisoning in children which appeared in our columns about a month ago, workers at the London Hospital [4] described a case in which the lead was found in the fæces after injection of parathyroid extract—a procedure whose use in this connexion we owe to Donald Hunter and J. C. Aub. Parathormone mobilises the lead in bone, just as it mobilises calcium, and thus increases the amount excreted, and it may be employed in this way, for diagnostic purposes, wherever there is a suspicion that stunted growth, renal rickets, or other abnormality is due to the action of lead. As was first demonstrated by Park [5] in 1930, characteristic appearances can also be recognised—at any rate in advanced cases—on radiographic examination. In illustrating their paper with radiograms showing these appearances, Dr. Jupe and his colleagues pointed out that very few cases of poisoning in children have been reported in England; and they must be right in thinking that others would be recognised if practitioners were more closely on the watch and could apply the proper methods of detection.

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[1] See The Lancet, 1934, i., 1014.

[2] Ibid., p. 1397.

[3] Deut. med. Woch., 1934, lx., 890.

[4] Rodgers, T. S., Peck, J. S., and Jupe, M. H.: The Lancet, July 21st, 1934, p. 129.

[5] Park, E. A., Jackson, D., and Kajdi, L.: Amer. Jour. Dis. Child., 1931, xli., 485.

The British Pharmaceutical Codex, 1934, is to be published on Sept. 28th.

Sir George Newman has been appointed to serve for a further five years as a Crown nominee on the General Medical Council.

Dr. James Collier will deliver the Harveian Oration before the Royal College of Physicians of London on St. Luke's Day, Thursday, Oct. 18th, at 4 P.M., his subject being Inventions and the Outlook in Neurology.

Sir George Seaton Buchanan has been appointed Master of the Society of Apothecaries for 1934–35. Sir William Willcox and Dr. J. S. Fairbairn again serve as senior and junior wardens.

We regret to announce the death on August 24th, after a short illness, of Dr. Eric Danvers Macnamara, consulting physician for psychological medicine at Charing Cross Hospital, and a psychiatrist of great experience and insight.

The theatre has obviously been at some pains of late to become better acquainted with the medical profession—at work, at play, and at the bar of judgment. Those of the profession who wish in turn to learn something of the theatre (not of acting alone but also of stagecraft and playwriting) are invited to join the autumn courses which are being arranged at the Everyman Theatre, Hampstead, by the Little Theatre, Citizen House, Bath. Details of the enterprise will be found in our advertisement columns.

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It is common knowledge that the great majority of those who suffer from acne in their youth eventually cease to be troubled by it (generally between the ages of 20 and 30), and unfortunately many medical men in general practice who have other and more serious diseases to think about are inclined to pooh-pooh "a few spots," and to advise no treatment as the sufferer "will grow out of it." No doubt he will, but perhaps not before he is permanently scarred and has suffered damage that may have far-reaching effects on his or her future life. Not only so but many girls, and some boys, become morbidly self-conscious about their spotty appearance, which casts a shadow over their lives. On all grounds therefore it is most important that acne vulgaris should be treated, and treated as early as possible, preferably before it has become pustular.

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There is a popular idea that X ray treatment causes or increases scarring. That this is not the case was called in when members of such a family fall sick and if these get well the bills are sent in and duly paid. If they die as a rule the bills are not sent in. This accounts for the statement that doctors get paid while members of the family are well and not while they are sick; but the real fact is that the doctors are paid if the patients get well but not if they die." Thus it will be seen that there is substance for the popular statement of the position, while the method of remuneration is a variant of the insurance system. Dr. Wu Lien Teh closes an interesting letter with a reference to the steady publication from his bureau of the National Quarantine Service Reports, and registers his belief that medical work in China is progressive in spite of troubled political conditions.

WEST LONDON HOSPITAL: PROPOSED MEDICAL SCHOOL FOR WOMEN

As was briefly announced in the Students' Number of THE LANCET last week a scheme for establishing a school of medicine for women at the West London Hospital is under consideration. For many years there has been a post-graduate medical college at the West London Hospital, but the approaching centralisation of post-graduate medical instruction at the new British Post-Graduate Medical School at Hammersmith has suggested to the medical staff of the West London Hospital that their activities might be more usefully directed. It is well known that the facilities for the instruction of women students in clinical medicine and allied subjects are insufficient for the present demand, and it seems the excellent idea for one more London hospital to give opportunities to women undergraduates. The proposal has not yet received the sanction of the board of the hospital, nor has any official approach yet been made to the University of London in whose province the activities of such a school would lie. The whole question is being given very careful consideration, but the announcement in the public press was premature, and no official statement has been made. The publicity given to the idea, however, should obtain both for the medical staff and lay authorities of the hospital practical arguments for the support of the scheme; and the more it is remembered that it is embryonic the more is it clear that suggestions will have a wide range within which to operate.

LEAD POISONING AND ITS RECOGNITION

OF late years there has been a revival of interest in lead as a poison. Not only have its clinical effects been reinvestigated but it has been suggested as a cause of various unexplained diseases—including, for example, nephritis in children [1] and eclampsia.[2] An understanding of the way in which the poison behaves depends on accurate means of discovering the metal and estimating its quantities in tissues and excreta. Prof. B. Behrens, of Berlin, has lately published [3] conclusions which he bases on a method of estimation devised by H. Fischer. None of the ordinary methods are, he holds, capable of giving trustworthy information about the very minute quantities of lead that one can expect to find in doubtful cases of chronic poisoning. In his experiment Behrens has used the radio-active form of the metal which enables him to estimate exactly quantities as small as 0·0001 mg. He is impressed by the fact that very little is absorbed of any given dose administered by mouth; once taken up by the red blood-cells, however, lead is readily passed on to the tissues, and the bones especially form a depôt where it remains. Excretion, through intestine or kidney, is very slow, and the result is that years after absorption has ceased large deposits may remain in the bone and by suitable measures may be recovered from the fæces. In a paper on lead poisoning in children which appeared in our columns about a month ago, workers at the London Hospital [4] described a case in which the lead was found in the fæces after injection of parathyroid extract—a procedure whose use in this connexion we owe to Donald Hunter and J. C. Aub. Parathormone mobilises the lead in bone, just as it mobilises calcium, and thus increases the amount excreted, and it may be employed in this way, for diagnostic purposes, wherever there is a suspicion that stunted growth, renal rickets, or other abnormality is due to the action of lead. As was first demonstrated by Park [5] in 1930, characteristic appearances can also be recognised—at any rate in advanced cases—on radiographic examination. In illustrating their paper with radiograms showing these appearances, Dr. Jupe and his colleagues pointed out that very few cases of poisoning in children have been reported in England; and they must be right in thinking that others would be recognised if practitioners were more closely on the watch and could apply the proper methods of detection.

THE British Pharmaceutical Codex, 1934, is to be published on Sept. 28th.

Sir George Newman has been appointed to serve for a further five years as a Crown nominee on the General Medical Council.

Dr. James Collier will deliver the Harveian Oration before the Royal College of Physicians of London on St. Luke's Day, Thursday, Oct. 18th, at 4 P.M., his subject being Inventions and the Outlook in Neurology.

Sir George Seaton Buchanan has been appointed Master of the Society of Apothecaries for 1934–35. Sir William Willcox and Dr. J. S. Fairbairn again serve as senior and junior wardens.

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[1] See THE LANCET, 1934, i., 1014.

[2] Ibid., p. 1397.

[3] Deut. med. Woch., 1934, lx., 890.

[4] Rodgers, T. S., Peck, J. S., and Jupe, M. H.: THE LANCET, July 21st, 1934, p. 129.

[5] Park, E. A., Jackson, D., and Kajdi, L.: Amer. Jour. Dis. Child., 1931, xli., 485.

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When acne occurs for the first time in an adult one should make certain that one is really dealing with acne vulgaris and not with one of the other conditions mentioned in the first part of this paper. If the condition proves to be a genuine acne vulgaris it is no more difficult to cure than ordinary adolescent acne.

Acne conglobata.—The type of acne in which the prognosis is definitely unfavourable is that known as acne *conglobata*. In sufferers from this complaint almost the whole skin may be covered with blackheads, many of them of large size, while on the front and back of the trunk are many pustular lesions in which the suppurative process has burrowed more or less horizontally into the skin causing ramifying tunnels of pus which, when they eventually heal, leave extensive and severe scarring. This type of acne is extremely resistant to treatment and may persist throughout the patient's life. Fortunately such cases are rare.

One may say therefore that the prognosis in any ordinary case of acne vulgaris is good provided that the disease is rationally treated and that the patient will coöperate.

A. C. Roxburgh, M.D., F.R.C.P.,
Physician in Charge of the Skin Department, St. Bartholomew's Hospital; Physician, St. John's Hospital for Diseases of the Skin.

SPECIAL ARTICLES

YELLOW FEVER IN THE ANGLO-EGYPTIAN SUDAN

SEROLOGICAL AND POST-MORTEM EVIDENCE

By T. F. Hewer, M.D. Brist., M.R.C.P. Lond.
BACTERIOLOGIST, WELLCOME TROPICAL RESEARCH LABORATORIES, SUDAN GOVERNMENT, KHARTOUM

The introduction of air travel has broken down one of the natural barriers to the spread of disease. When travel, in Africa and the Orient particularly, was confined to land or sea there was usually ample time for people to develop recognisable signs of any serious disease before they reached their destination; this was especially true of yellow fever, whose incubation period is only rarely more than six days. It is now possible for a person to be bitten by an infected mosquito in Central Africa and arrive in Cairo before he becomes ill. The recognition of this possibility, even though it be a very remote one, makes it urgently necessary to introduce preventive measures. If quarantine regulations were enforced at every air port, the passengers being kept in mosquito-proof rooms for two days or more on arrival, it would be worth no one's while to travel by air: it is obviously impracticable. Attention must then be directed to the prevention of infection of the passengers in transit and before they embark; and the first requirement is an accurate knowledge of the present geographical distribution of the disease. A few years ago it was thought sufficient to control aircraft coming from West Africa—a known endemic centre of yellow fever—but now there is evidence suggesting that the endemic area is very much larger than this.

SEROLOGICAL EVIDENCE

During the last two years a yellow fever immunity survey of Africa, instigated by the International Health Division of the Rockefeller Foundation, has revealed the presence of silent areas in which the disease appears to have been present without arousing the suspicions of the local medical authorities.

The survey depends upon the mouse-protection test evolved by Sawyer and Lloyd.[1] The test consists essentially of the inoculation of mice intraperitoneally with yellow fever virus, fixed for mice, together with the serum to be tested, and the simultaneous injection of starch solution into the brain to localise the virus. If the serum lacks protective power the mice die of yellow fever encephalitis. There is good evidence for the specificity of the test, and it appears that the protective bodies remain for many years, if not for life, in the blood of persons who have recovered from yellow fever.

Sera have now been collected from representative groups of adults and children in the southern and western provinces of the Sudan and in the central district of Khartoum. They were all sent to New York, where Dr. W. A. Sawyer carried out the tests in the yellow fever laboratories of the International Health Division of the Rockefeller Foundation. The results, which are being published in detail by Dr. Sawyer and Dr. Loring Whitman, indicate that the disease was present in Darfur province about eighteen years ago, 13 out of 61 adults over eighteen years of age giving protection, while not one of 46 children of various ages down to three years was positive. One of the positive adults was found, on subsequent inquiry, to have been resident in French Equatorial Africa for some years.

At El Obeid, in Kordofan Province, there were no protective sera among 52 persons of ages ranging from five to seventy, but in the Nuba Mountains, some eighty-five miles to the south, 7 out of 30 adults were positive, the youngest being thirty years of age; all the 15 children tested were negative.

The largest percentage of positive results was obtained from the Bahr-el-Ghazal province: at Wau 7 out of 27, and at Rumbek 17 out of 30 adults had protective sera. Three out of 24 children at Wau (aged six, six, and nine years), and 1 of 26, aged eleven years, at Rumbek gave positive results. No children, but 5 of 20 adults at Sources Yubo, and 4 of 16 adults at Li Rangu were positive, the youngest being aged thirty and twenty-eight respectively.

In Mongalla province at Juba, the Imperial Airways port on the Cairo to Cape route, out of 28 adults 3 were definitely positive and 3 others gave partial protection, which was considered inconclusive; 3 out of 22 children, aged seven, seven, and eight,[*] were also positive. At Amadi no children but 2 adults, aged twenty and forty, out of 20 tested, were positive.

In the Upper Nile province 19 children at Yirol were negative, no adults being tested; and at Malakal, another Imperial Airways port, among 55 persons, children and adults, there was 1 definitely positive, aged eighteen, and 3 inconclusive, aged eleven, eighteen, and thirty-five.

In Khartoum the only positive result was obtained with the serum of a man who had been resident in the Nuba Mountains. At Kosti, on the White Nile, the only positives were in people who were natives of Darfur, the Nuba Mountains, and the southern Sudan, thus tending to augment the results obtained in those areas.

In summary, from the results of the mouse-protection test it appears that yellow fever was present, probably in endemic form, in the Bahr-el-Ghazal six years ago; in Mongalla seven years ago; in the Upper Nile province between eleven and eighteen years ago; in Darfur eighteen years ago; and in the Nuba Mountains thirty years ago. There is no evidence that the disease was ever present in the desert areas to the north of the Sudan, the sera from El Obeid and Khartoum being entirely negative. It should be noted that in every case great care was taken to make sure that every person tested had lived all his life in the district being surveyed. A further check-up on the positive cases is still in progress in the Bahr-el-Ghazal.

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[*] The ages of these children were wrongly estimated in the first instance and reported to the Office d'hygiène as 12, 13, and 14.

CLINICAL EVIDENCE

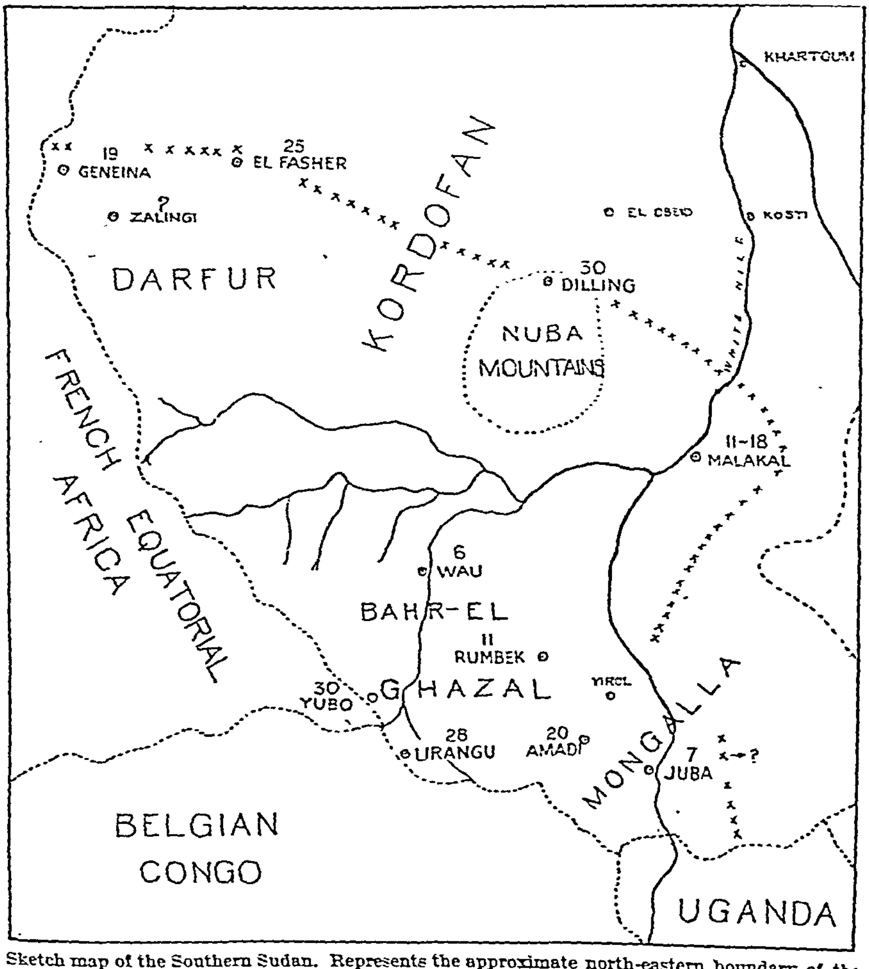
Although the mouse-protection test appears to be perfectly reliable and specific it really only provides data as to the presence of yellow fever in the past. When positive results are obtained in all age-groups of a community from three years upwards, in the absence of a recent widespread recognised epidemic, it is probably safe to assume that the disease is actually present in the locality; but the implications of such a decision are so serious that one must have more conclusive evidence.

Classical clinical cases of yellow fever occurring in epidemics in a susceptible population are generally easy to diagnose, but in the known endemic areas of West Africa and Brazil the classical manifestations of the illness are seldom seen. Soper, Rickard, and Crawford[2] have found the clinical diagnosis most difficult in those endemic regions in Brazil where the disease is most constantly present. In the native population the recovery-rate is high, and even in the fatal cases the classical signs and symptoms are often absent. It seems that any acute febrile disease in an endemic area may be yellow fever.

The issue is further complicated by the presence in Africa of a number of conditions, of unknown ætiology, giving rise to necrosis of the liver. In the Bahr-el-Ghazal province there was a small epidemic of jaundice in 1929; histological examination of the liver was made in a few instances and the disease was definitely not yellow fever. Moreover, the mouse-protection test was done on the sera of two persons recovered from the jaundice disease in this epidemic, and they were both negative. Similar isolated cases of hepatic necrosis and so-called "catarrhal jaundice" occur at frequent intervals in all parts of the Sudan. The spirochæte of Weil's disease has never been found.

Blackwater fever is another Sudan disease which bears certain resemblances clinically to yellow fever. It has, in particular, the common characteristic of occurring most frequently in Europeans who, being highly susceptible to yellow fever, are the very people who are likely to show clinical and classical signs of the latter disease. Blackwater fever is very common in the Bahr-el-Ghazal. The mouse-protection test has been performed on the sera of 7 Europeans, 1 Indian, and 4 Sudanese who had contracted blackwater fever in Darfur, Mongalla, and Bahr-el-Ghazal provinces; none of them gave any protection.

An interesting corroboration of the protection tests in Darfur is provided in a recent article by Prince Omar Tousson.[3] He gives an account of a battalion of 453 Sudanese soldiers in the Egyptian army, recruited from Darfur and Kordofan (in which province lie the Nuba Mountains), who were sent by Said Pasha to the Mexican War in 1863 to render assistance to Napoleon III. African troops were in great demand because they were known to be immune to yellow fever. The mortality from that disease among Europeans at Vera Cruz was alarming. Of these 453 Sudanese only one, their commanding officer, died of yellow fever; it is not clear whether he was Sudanese or Egyptian. It seems likely that this immunity was due to previous infection in the Sudan.



Sketch map of the Southern Sudan. Represents the approximate north-eastern boundary of the endemic area of yellow fever, as suggested by the mouse-protection test results. The figures over the place names are the ages of the youngest people whose sera were positive. The Imperial Airways use aerodromes at Khartoum, Kosti, Malakal, and Juba.

POST-MORTEM EVIDENCE

Since the clinical recognition of mild cases of yellow fever is impossible one must employ some more certain means of diagnosing the disease. This is provided by a routine histological examination of the liver of every person who dies of an acute febrile illness.

In Brazil protection tests gave positive results in some areas in which there had never been any suspicion of the presence of yellow fever. As in the case of the Sudan there were two possible explanations of these findings: either the test was not specific or yellow fever was present in such a mild form that deaths never resulted. Soper, Rickard, and Crawford made routine histological examinations of the livers of all persons dying of any acute febrile disease of less than ten days' duration in these regions and found a large number with definite evidence of yellow fever, thus proving that the "silent" areas are only silent because of the impossibility of recognising them clinically. They have invented an ingenious instrument, called a viscerotome, which can be inserted into the liver of a corpse without the necessity of doing a post-mortem or opening the abdomen. The Rockefeller Foundation has very generously presented the Sudan Government with a number of these instruments, and they have been distributed to the suspected provinces with instructions to the medical inspectors to collect specimens of the liver of every case of fatal acute febrile illness of less than ten days' duration. These specimens cannot be obtained as easily as in Brazil, because of the prejudice of many of the tribes against any violation of dead bodies; and so far very few sections have been examined.

On June 30th, 1934, the following details of a case, which proved to be yellow fever, together with pieces of the liver and kidney for section, were received from Dr. G. C. Cochrane, medical inspector, Wau.

A native of Wau town, 18 years of age, a fisherman by trade, was admitted to Wau Hospital on June 9th, 1934, suffering from fever and jaundice. His illness started, four days before admission, with several repeated chills followed by fever, severe pain in the epigastrium, and bilious vomiting. The jaundice was not noticed till the day of admission.

On examination he was markedly jaundiced, with temperature 100·2° F. and pulse-rate 80; complained of severe epigastric pain. Tongue coated; no vomiting; bowels open. Heart and lungs normal. Liver and spleen not palpable. Reflexes normal. Blood films were examined for malaria and relapsing fever parasites with negative results. The urine was loaded with albumin and contained no sugar. Nothing was found in the fæces.

On June 10th there was marked delirium; temperature 99°–100° F.; pulse-rate 85. Became comatose in the afternoon. One ounce of urine obtained by catheter, heavily laden with albumin. June 11th: deep coma; temperature 101°–102° F.; pulse 85–90. Urine very scanty by catheter. June 12th (eighth day of illness): patient died.

Time has not permitted of getting a more detailed history of the case from Dr. Cochrane; the mail service runs only once a month. His notes on the post-mortem examination are as follows: "No hæmorrhages in the skin. All tissues deeply stained yellow. Liver: normal size, friable, and deeply yellow. Spleen: normal, rather small. Kidneys: enlarged and congested."

The liver showed advanced necrotic changes and Councilman lesions highly suggestive of yellow fever. A section was sent to Dr. G. M. Findlay, of the Wellcome Bureau of Scientific Research, London, who confirmed the diagnosis. In the kidney the outstanding feature was degeneration of all the epithelial cells, including those covering the glomerular tufts and all the tubules; no cellular infiltration. The lumen of the tubules contained hyaline amorphous material.

This is a case whose diagnosis might well be made on clinical grounds, but the heavy albuminuria seems to be the only feature in which it differed from some other very similar conditions which were shown, on section of the liver, to be hepatitis of unknown ætiology.

Such spectacular cases are not very frequently seen, and judging by the results of the mouse-protection tests in Wau and Rumbek districts the majority of the infections must be extremely mild and impossible to diagnose.

DANGER TO FOREIGN RESIDENTS IN ENDEMIC AREAS

One of the first points raised by critics of the protection test results in the southern Sudan has been the apparent absence of any case of yellow fever among the foreign residents. There are several factors which may be adduced to explain this apparent anomaly.

The total foreign population (non-Sudanese) of the Darfur, Bahr-el-Ghazal, and Mongalla provinces, comprising a total area of approximately 293,000 square miles, is only 580 persons. In the Upper Nile Province, where there is much less evidence of the presence of yellow fever, the foreign population numbers 306, mostly in the town of Malakal. In the Bahr-el-Ghazal and Mongalla provinces there are also about 100 natives of the northern Sudan (government employees, servants, &c.) and, as they are undoubtedly susceptible to infection with yellow fever, they should be added to the total of foreign residents. This leaves us with only some 700 persons, in an area of 293,000 square miles, who are definitely at risk and capable, if infected, of being diagnosed clinically. Moreover, a large proportion of the Europeans live in mosquito-proofed houses placed at some distance from the native quarters.

The stegomyia mosquito, which is the chief vector of the disease, is extraordinarily local in its habits. Mosquitoes bred in one house or garden are not at all likely to travel more than a hundred yards in any direction. As they frequent houses they are less likely to be carried far by wind than are the anopheline carriers of malaria. It will be seen that it is therefore possible for yellow fever to exist in the native quarter of a town and for stegomyia mosquitoes to be common in all districts and yet, because the infected mosquitoes do not migrate from one quarter to another, the disease may not spread.

There is some reassuring evidence that the risk is not as great as might be imagined. Protection tests were done on the sera of 7 Europeans, 1 Indian, and 13 natives of the northern Sudan who had been resident for periods between 5 and 30 years in the Bahr-el-Ghazal and Mongalla provinces: all were negative.

Five of the Europeans were Italian missionaries who had lived in houses without any mosquito proofing. The 13 natives of the northern Sudan had lived in native quarters, also without any protection from mosquitoes. On the other hand, this gives no idea of the number who may have been infected with the disease and succumbed. There is still a possibility that some of the deaths attributed to blackwater were in reality yellow fever.

THE MOSQUITO VECTOR

A mosquito survey is still in progress, but the following data, although incomplete, give some idea of the distribution of the important species.

Aëdes (*Stegomyia*) *ægypti*, the acknowledged vector of yellow fever, occurs in Khartoum, but has been found commonly in El Obeid, the Nuba Mountains, and Darfur (Fasher and Geneina). In Juba it is regularly obtained from stagnant water in and near houses. At Wau very little collecting has been done but this mosquito has been recorded. Its presence is also reported from other parts of Mongalla province. In Malakal specimens were collected in 1909 but there has been no subsequent record, and it would not appear to be common.

A few specimens of *Aëdes luteocephalus*, another possible vector, have been found at Juba. *Aëdes apicoannulatus* and *A. africanus* have not so far been found in the Sudan, but *A. vittatus* is abundant in the Nuba Mountains, Darfur, and Mongalla, including Juba. *Mansonia* (*Tæniorhynchus*) *africanus* has been recorded from Fasher, Juba, and Malakal.

Dr. Aldridge and Dr. Stephenson, of Juba, have been very active in collecting mosquitoes, and it is possible that stegomyia may be found elsewhere more commonly than the present records would lead one to suppose.

MEASURES TAKEN AT AERODROMES

The Sudan Government has become signatory to the International Convention for Aerial Navigation. At Juba disinsectisation of all planes is carried out, and the passengers are medically inspected in order that any who have been exposed to a risk of infection may be placed under observation. The hotel where passengers and crew spend the night is mosquito-proofed and the quarters of the local officials of the Imperial Airways are also proofed. Disinsectisation and medical inspection of north-bound planes is repeated in Khartoum.

The aerodromes at Juba and Malakal have been made anti-amaryl to satisfy the rigid regulations of the Air Convention, and the Bahr-el-Ghazal province has been closed to all international air traffic and all aircraft within the Sudan. Article 47 of the International Sanitary Convention for Aerial Navigation has been enforced at Juba and Malakal, and passengers from the Bahr-el-Ghazal province will be subjected to observation for the prescribed period.

DISCUSSION

The reliability of the mouse-protection test for yellow fever has now been established beyond any possible doubt. In Brazil the test gave positive results in previously unsuspected regions, and post-mortem evidence subsequently justified them. Precisely the same sequence of events has occurred in the Sudan.

Positive protection tests were obtained by Dr. Sawyer (unpublished) with sera from French Equatorial Africa and the Belgian Congo, especially high percentages being found in the northern part of the Congo, where it joins the Sudan, and in the adjacent French territory.

The area in which yellow fever is endemic in Africa appears to be roughly triangular in shape, with its base on the west coast and its apex in the southern Sudan. This enormous stretch of country can never be cleared of mosquitoes, and any hope of the final eradication of yellow fever from Africa becomes extremely remote. One must aim at limiting its spread. The exact boundaries of the endemic areas will have to be more accurately defined by further protection tests. We do not yet know how far it reaches to the east of Juba. Mosquito control can be enforced in the chief towns and government stations, but it is impossible in the outlying villages. With greater medical vigilance more cases of the disease will be recognised and proper precautions taken.

It is absolutely essential that all houses occupied by foreigners should be adequately mosquito-proofed.

An additional and effective measure of protection will shortly be available for all persons visiting or residing in the yellow fever zone. In 1931 Sawyer, Kitchen, and Lloyd [4] immunised ten persons with a mixture of neurotropic yellow fever virus, fixed for mice, and immune serum. These workers in New York, and Marshall Findlay [5] in London, have now greatly improved the method of immunisation so that the risks of unpleasant reactions are comparatively slight. It is to be hoped that it will be possible very shortly for all persons flying through Africa to be inoculated; the danger of spreading the disease by air will then be practically eliminated.

SUMMARY

(1) The results of a yellow fever immunity survey by the mouse-protection test of the Anglo-Egyptian Sudan are reported. (2) On the strength of these a wide zone in which the disease appears to be, or to have been, endemic has been defined. The Imperial Airways route to the Cape runs through this zone. (3) A case highly suggestive of yellow fever both on clinical and pathological grounds occurring in a native of Wau is described. (4) The difficulty of diagnosing mild, or even fatal, attacks of the disease in the native population is discussed. (5) Measures adopted for preventing the spread of the disease by air are described and a plan of campaign for combating it is briefly outlined.

ACKNOWLEDGMENTS

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My grateful thanks are due to Sir Robert Archibald, director of the Wellcome Tropical Research Laboratories, Khartoum, and Dr. E. D. Pridie, director of the Sudan Medical Service, for allowing the survey to be made and for their advice and assistance. We are also indebted to Dr. G. M. Findlay for confirming the diagnosis of the section of liver from the case of yellow fever.

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LONDON LOCK HOSPITAL.—Last year there were 23,369 in-patients, out-patients made 180,000 attendances, and over 18,500 pathological tests were made. It is the only voluntary hospital which admits maternity cases suffering from venereal disease, and in 1933 of 53 deliveries there was only one stillbirth, and no baby born of a treated syphilitic mother bore signs of the disease. Lord Kinnaird, the chairman of the board of management, explains that the hospital is so handicapped by a debt of £20,000 that "unless substantial donations are immediately forthcoming it will be compelled to close down."

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF MEDICINE

At the last meeting of this section the chair was taken by Prof. J. G. Emanuel (Birmingham), vice-president, and Dr. T. Izod Bennett (London) opened a discussion on

Œdema, its Causation and Treatment

In all cases, he said, œdema implied that the passage of fluid into the tissue spaces exceeded the return from them into the lymphatics and capillaries. Attention must be concentrated on the region and boundaries of the tissue spaces. The only two factors of major importance governing the passage of solution from the capillaries to the tissue spaces and back were the intracapillary blood pressure and the colloid osmotic pressure of the plasma proteins. The thin capillary wall acted as a semi-permeable membrane. The intracapillary pressure was probably very difficult to increase at the arterial side, but at the venous side it was easily raised by any condition of back pressure, such as failure of the right heart. The colloid osmotic pressure tended to counteract the intracapillary blood pressure, and was a constant drag on the passage of fluids from the capillaries into the tissue spaces. As transudation took place the forces gradually became balanced, until there was a flow in the reverse direction. The colloid osmotic pressure was diminished by loss of protein from the blood, as in extreme albuminuria—and loss of albumin was more important than loss of globulin. The removal of plasma proteins in animals produced œdema, and a loss of plasma proteins into the peritoneum, stomach, or elsewhere in man had the same effect as prolonged albuminuria. This factor was of extreme importance in the production of œdema. Increased permeability of the capillary wall might be of some importance in acute nephritis, and certainly was important in urticaria, but it would not by itself produce œdema, which was in this case probably due to the resulting transudation of protein through the capillary wall. Sodium chloride was in all cases an important factor in determining chronicity. It would not produce œdema alone, but it tended to hold water in the tissue spaces, and so in almost all cases was of importance as an ancillary; it was the sodium ion that was important and not the chlorine.

Treatment must be based on a consideration of these factors. Anything improving the output of the right ventricle would ameliorate cardiac œdema. Prolonged rest was therefore essential and digitalis was most valuable if auricular fibrillation was present. The progress of œdema could be watched by observing the water balance, all fluids taken during the 24 hours being set out against the total output of urine. The fluid intake should be limited to 25 to 30 oz. daily, and only traces of salt should be allowed in the diet. If, in spite of rest, diet, and digitalisation, œdema persisted, the mercurial diuretics, particularly salyrgan, were often very valuable, and the diuresis produced by them was increased if ammonium chloride was given simultaneously. Acute pulmonary œdema required morphia and immediate venesection. Its onset was signalised by cardiac dilatation, paroxysms of nocturnal dyspnœa, and the appearance of moist sounds at the bases of the lungs. There were two, probably three, varieties of renal œdema. There was a terminal œdema due to cardiac failure in chronic nephritis with high blood pressure; this was not usually accompanied by renal failure, and was no contra-indication to salyrgan. The second variety was seen in so-called "nephrosis," in which long-standing albuminuria had reduced the plasma proteins so much that œdema appeared. There was heavy albuminuria without rise of blood pressure, and without any of the changes characteristic of renal failure. A high protein diet was indicated, vegetable protein particularly being given. Salt should be forbidden and the water intake limited. Salyrgan was not contra-indicated unless there was a progressive renal lesion. The treatment was entirely different in acute and subacute glomerular nephritis. In these cases no strain must be thrown on the kidneys. Starvation must be as complete as possible in the early period, and remarkable recoveries were frequently achieved by restricting food to small amounts of fruit. Subacute and chronic cases were more difficult. A low protein diet was usually indicated, and septic foci must be eliminated.

Dr. A. W. Stott (London) said that a large number of cases of chronic heart disease ultimately died of congestive heart failure, a name which stressed the fundamental feature of the syndrome: venous congestion throughout the body. The clinical features were easily recognisable—orthopnœa, cyanosis, abnormal fullness of the jugular veins, enlarged liver, ascites, and subcutaneous œdema. Mistakes in diagnosis were occasionally made. There must be obvious evidence of venous engorgement, especially in the neck, liver, and lungs. So late a stage of the condition should be prevented if possible, but unfortunately the cause of failure of the heart was not known. Sometimes an infection, even a trivial one, might precipitate it; in others it began with auricular fibrillation. The fact of early myocardial weakness should be recognised if possible, and the cardiac reserves maintained. The danger signal of increasing dyspnœa warned the physician long before signs of congestion appeared. The patient should then be rested and protected as far as possible against infection, and the ventricular rate controlled by digitalis. Even with gross failure, full doses of digitalis would often bring about dramatic results, but there were resistant cases, and few patients suffering from severe congestive failure with a normal rhythm were much helped by this drug. For them there must be complete rest—not such a simple matter as it seemed. A relatively upright position was advantageous to a patient suffering from the severe discomfort of generalised œdema and orthopnœa. Failing a cardiac bed, it was often best to keep the patient in a comfortable chair. Meals must be small, dry, and easily digestible, and only 20 to 30 oz. of fluid should be given in the 24 hours. The xanthine and mercurial diuretics were the most useful. Theobromine and theocin might cause gastro-intestinal disturbance, and should be discontinued if they did not act within a few days. Salyrgan was powerful and practically non-toxic, and rarely caused unpleasant effects. Its results might be increased by producing a preliminary acidosis for a few days, but this was not often necessary. Treatment did not end with relief of œdema; the patient must always thereafter lead a restricted life. A prophylactic injection of salyrgan once or twice a week might prove to be as valuable as its more dramatic use.

Dr. H. Gainsborough (London) confined himself to renal œdema and thought that the condition called nephrosis was really nephritis. There was every conceivable grade between the extremes of acute and chronic nephritis, and a distinction between them was artificial; one cause might produce varying effects. The chronic form showed an insidious onset, a heavy albuminuria and œdema, which might last for months or years, and might come and go. Recovery was, however, rare, and when albuminuria persisted after the tendency to œdema had finished, there was a period of apparent latency, and then the symptoms reappeared. Increasing destruction of the kidney abolished œdema, and possibly the same factor might control œdema in acute cases. Very little advance could be recorded in the treatment of renal œdema. The most effective diuretics were urea, acidosis-producing salts, and organic mercury compounds such as salyrgan. Urea was always indicated, but sometimes failed. The salts sometimes worked excellently but sometimes caused nausea. Salyrgan quite possibly acted by damaging the kidney, and it seemed most unwise to give any drug which might add to the harmful influences affecting that organ. The patient must be treated generally with good food, sunlight, fresh air, and warmth, but the protein of the diet must be kept down to basal requirements. Iron was sometimes helpful; over-hospitalisation was to be avoided, and the patient needed a sanatorium type of life.

Dr. GEOFFREY EVANS (London) said that the œdema of kidney disease might appear in a cardiac form, in a subthyroid form, or, rarely, in an angioneurotic form. There was often a cardiac factor in both acute and chronic nephritis, and digitalis might be of real value. Prompt improvement might follow venesection in acute nephritis, and occasionally thyroid might do good. The toxic factor might be present in all forms of Bright's disease, and starvation might be helpful. In any single case of nephritis the ætiological factors might be varied. Whatever the type of the disease, the physician must look out for the possible presence of any of the known factors producing œdema. Salt restriction might be useful in some cases, and in others might prove intolerable and lead to uræmia. Salyrgan must always be used with caution in kidney disease. Decapsulation was useful in selected cases.

Dr. J. MAXWELL (London) said that the chief factors concerned in the causation of œdema were: (1) increased capillary pressure; (2) increased capillary permeability; (3) alteration in the osmotic balance between the plasma and the tissues, particularly in respect of their protein and sodium contents; and (4) certain little understood factors such as the endocrine system and the hypothetical water-regulating centre.

Increased permeability meant that colloids were passing out of the vessels, which should not normally occur. Certain substances, however, such as alcohol and mercury salts, could bring it about. There was a good deal of protein in the œdema fluid of acute nephritis, inflammation, and heart failure, but very little in nephrosis and nutritional œdema. The chief causes of localised œdema were acute inflammations, urticaria and, rarely, renal conditions. It had been suggested that urticaria was the result of the local release of a substance resembling histamine, rendering the capillaries temporarily more permeable. Injection of adrenaline into the swelling was often very effective, but no known method prevented the attacks. Calcium therapy sometimes relieved the patient and often failed; protein shock had only temporary success, and specific desensitisation unfortunately only rarely gave good results.

Dr. F. BOTTOMLEY (Bournemouth) thought that heat was valuable in certain cases, as shown by an increase in the excretion of urine.

Prof. LANGDON BROWN (Cambridge) said that the value of hot air baths probably depended largely upon the removal of salt from the tissues in the resulting sweat. If the patient was responding well, there would be diuresis, and the sweating would occur at a progressively lower temperature. In the early stages of acute nephritis he recommended a diet of fruit juice and glucose.

Dr. E. L. SERGEANT (Hangchow) suggested that the blood calcium might be examined in the angioneurotic type of œdema, from analogy with rhinorrhœa.

Dr. N. E. WATERFIELD (Great Bookham) regretted no mention had been made of the value of intramuscular inoculation of the patient's own blood, a method of treatment he had often found successful when all other methods had failed in urticaria or angioneurotic œdema.

Dr. W. N. LEAK (Winsford) commented on the possibility of an associated vitamin loss.

Dr. JOHN PARKINSON (London) thought that rest in a chair was not so good as rest in bed. He would not himself restrict digitalis to auricular fibrillation; he had found it useful in œdema when rhythm was normal and sometimes in postponing the onset of œdema.

SECTION OF PATHOLOGY, BACTERIOLOGY, AND BIOCHEMISTRY

A MEETING of this section, with Prof. J. W. BIGGER (Dublin), the president, in the chair, was devoted to the value of

Antiseptics in Control of Bacterial Infections

Prof. C. H. BROWNING (Glasgow) emphasised that, though Lord Lister had left little printed record of his theory or methods, and that little rather a confused record, Sir Hector Cameron, one of his students and friends, had clearly summarised them. Lord Lister did not employ carbolic acid in the treatment of abscesses, although his imitators did. But naturally he was limited in his practice by the antiseptics then available. In the main modern opinion agreed with Lister's opinions on his antiseptics; though there were some, such as boric acid, which he had belauded, which now found little support. The great ambition of Ehrlich, the finding of an antiseptic capable of restraining the harmful action of bacteria while being entirely innocuous to man, was still a legitimate and an increasingly hopeful objective. The older antiseptics were deleterious to living tissue, and were usually ineffective in the presence of serum. New antiseptics, entirely innocuous and little affected by serum, had been found; among others, brilliant green and flavine were particularly worthy of attention.

The power of an antiseptic to kill an organism was usually measured by the Rideal-Walker or Chick-Martin test. But these tests only touched the fringe of the problem. Organisms differed greatly in sensitiveness to the antiseptic; perhaps we should select a specific antiseptic against specific organisms. Moreover, the limitation of virulence of organisms without actually killing them was possible with certain organisms and certain antiseptics. The possible reaction of the host, and its assistance through the stimulus of the antiseptic, must not be forgotten. The study of antiseptics was made easier by the use of actual living tissue, in the animal body or in tissue culture. In one instance a control experiment, on a human being, was possible, and had

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shown the marked benefit of flavine compared with boric acid. In animals the diphtheria bacillus was an exceedingly useful test organism for examining the power of antiseptics to prevent infection and to arrest it in the early stages. Antiseptics must be considered in relation to their action before infection, in early and localised infections, and in generalised infections. Only in the first two cases were they now of proved value. But physicians, surgeons, bacteriologists, and chemical physicists must unite in extending the present boundaries of chemotherapy.

Dr. R. J. V. PULVERTAFT (London) said that Prof. Browning's optimism, as the originator of most that was valuable in chemotherapy, was encouraging and stimulating. The fact that conditions innocuous to man yet harmful to the organism could exist was proven by normal recovery to infection, and supported by the daily practice of housewives, house surgeons, and pathologists when they cut their fingers. He drew attention to the variability of test organisms and in particular of the Rawlings strains of *Bacillus typhosus*, used in the Rideal-Walker test, and described experiments showing how antiseptic values varied with bacterial growth phases. He criticised the use of mercury salts in septicæmia, of urinary antiseptics, and so-called germicidal anæsthetics, and in conclusion asked for entirely new criteria of antiseptic values to be officially laid down.

Dr. G. W. THEOBALD (London) asked for greater consideration to be given to the reaction of the host rather than the bacillus. Life was a complicated biological problem, not to be confined to test-tube experiments. He particularly instanced the possibility of hepatic damage in various conditions and its effect on inflammatory reaction. He described excellent results in midwifery following a careful aseptic and antiseptic routine. Mercurochrome was, he believed, of value, but chiefly in acute infections with *B. coli.* He also believed in the efficacy of brilliant green and acriflavine in localised infection, and mentioned the well-established prophylactic value of gargling in support of chemotherapy.

Mr. ZACHARY COPE (London) thought that chemotherapy was returning to popularity. The newer antiseptics, such as the hypochlorites and flavine, were far better than the older ones, which often even produced pustules on the skin. In general, however, antiseptic treatment was limited to infections under four hours old. Antiseptics could not penetrate into devitalised tissues, and could not touch established and generalised infections. Here the classical surgical weapons of excision and drainage were still supreme. But he thought surgeons and bacteriologists might well revise some of their ideas in the light of Prof. Browning's discoveries and those of his co-workers.

Dr. SYDNEY THOMSON said that antiseptics had a wide use in dermatology. Their specific action was often helped by their solvent action on tissues, such as that of tri-chlor-acetic acid and salicylic acid. The action of ichthyol was difficult to explain on the basis of its antiseptic value. He drew attention to the dangers of mixed antiseptics—of iodine and mercury, causing a biniodide burn, and zinc oxide and eusol. Personal idiosyncrasy to antiseptics such as picric acid made choice of antiseptic important. In agreement with other speakers, he expressed his high opinion of brilliant green and flavine treatment.

Sir ARNOLD LAWSON (London) was more impressed by the value of drainage than antiseptics in the treatment of conditions of the eye. He did not consider the antiseptic action of lysozymes as described by Prof. A. Fleming to be of much importance. The usual rule appeared to be that the worse the eye, the more generous should be antiseptic treatment; the reverse was in fact true, and this often led to corneal ulcers. Silver salts were effective antiseptics, but irritant, and he used acriflavine as the antiseptic of choice in most cases, in a strength of 1 in 2000.

Mr. J. S. WOOD (Parkstone), speaking as a veterinary surgeon, pointed out how differently different animals reacted to infection and antiseptics. The paler the flesh of the animal, the more rapidly it healed; the pig healed very quickly. Flavine was not much used in veterinary surgery, partly because of expense. Glycerin, potassium permanganate, and sea water, which in Bournemouth was laid on in pipes, were the chief veterinary antiseptics.

Dr. L. P. GARROD (London) said there was too much "clinical impression" and too little serious testing in the matter of chemotherapy. Ridiculous claims were made for certain antiseptics owing to the use of inept testing methods. Bacteriologists were not going the right way to impress surgeons; and it was the surgeons who had to be impressed. There were not enough standard and scientifically adapted tests; such tests should be provided.

Prof. BROWNING, in reply, said there was at present no alternative to orthodox surgical treatment of established infection. But much ground had been consolidated, and the antiseptic of the future was likely to be as much better than those of the present day as ours were than Lord Lister's.

Staphylococcal Infections

Dr. H. J. PARISH (London) then read a short communication on new methods in the treatment of staphylococcal infections. He mentioned the older methods of vaccines, bacteriophage, and Besredka's local immunisation. Toxoid and antitoxin were new methods and might sometimes be used together. There were conflicting reports on the value of toxoid treatment. This might be attributable in part to the complexities of staphylococcal toxins; but toxoid treatment undoubtedly raised the antihæmolytic value of the serum and was praised by many workers in the treatment of boils, sycosis, and osteomyelitis. Blepharitis was particularly benefited and certain diabetics with staphylococcal infections ceased to need insulin after its use. Data on the value of antitoxins were less full, but on the whole encouraging. But more knowledge of the nature of staphylococcal toxin was necessary.

The PRESIDENT, as one of the first workers on the toxin, wished to know how many staphylococcal toxins there now were; this Dr. PARISH described as a difficult question. Dr. E. ff. CREED (London) did not believe in a direct relationship between antitoxic value in the serum and general immunity, and Dr. GARROD supported this view and suggested that bactericidal properties of serum were being forgotten. Dr. PULVERTAFT gave some support to the value of toxoid and antitoxin, but suggested that the dosage of toxoid required more study, since increase in the dose did not always give more antihæmolysin in the serum.

SECTION OF MEDICAL SOCIOLOGY

Dr. H. GUY DAIN (Birmingham), president, took the chair at this section, when Dr. G. P. CROWDEN (London) opened a discussion on

Defective Hearing as a National Problem

The national and individual handicap of visual defects had, he said, been very markedly reduced, but the same could not be said of hearing. The special question of the congenitally deaf had been given careful and detailed attention; the problem under discussion only arose with acquired deafness. It was computed that there were approximately 40,000 totally deaf individuals in Great Britain at the present time, but the number of partially deaf or "hard of hearing" was largely a matter of conjecture. It might be estimated at 2,500,000. Many of these, however, were not seriously handicapped. For the remainder, special problems of social life, education, and employment had to be faced. In the majority of cases the cause of defective hearing was disease, and the subject must be approached from the points of view of both preventive and curative medicine. Army statistics were enough to convince anyone of the serious state of the health of young manhood. The chief cause of rejection of men applying for service was middle ear disease. The ratio of rejections for this cause had in recent years increased to over 50 per 1000, and the same condition headed the list of causes of discharge within six months of enlistment. In 1928, out of 53,075 applicants for service in the Army, 2568 had been rejected as physically unfit on account of diseases of the middle ear and deafness. In 1932, 54,159 men were examined and 2993 rejected for the same reason, while a further 290 were discharged as unfit on these grounds within six months of enlistment. Therefore, between 5 and 6 per cent. of the young men of the nation showed evidence of diseases associated with deafness. The problem was, therefore, obviously one of great national importance.

Although disease was the principal cause of defective hearing, deafness might also be caused by noisy employment or accident and advancing age. Before any steps could be taken to prevent and limit the ravages of diseases affecting hearing, it was essential to know the common age of onset and to find a reliable routine method of diagnosis. The returns of the routine inspection of school-children recorded defects of hearing in only 4·2 per 1000. It seemed highly probable that a great deal of minor impairment of hearing in children passed unnoticed owing to the difficulty of testing under the conditions of school medical inspection. The 4a gramophone audiometer was an ideal method for group testing of children and for detection of the early signs of deafness. A hundred children an hour could be tested in groups of 32 or 40. A preliminary survey on children in the Borough of Hornsey had shown that the audiometer picked out all the known cases of hearing defects, and also a large number of previously unsuspected cases, all of whom were found by the aurist to need treatment. The total was 6·6 per cent. instead of the 0·42 per cent. of the annual returns. Subsequent tests have confirmed these findings, and had shown that methods of prevention must be devised to include children of pre-school age. Deafness due to noisy employment was most satisfactorily combated by an ear-stop of cotton-wool and wax, as devised by Mr. W. R. Luxton. The experience of the school medical authorities in Tottenham had proved that it was possible and practicable to detect and treat a very large proportion of cases of early ear disease, and to restore hearing to normal in many cases where the defects were severe. If this could be done locally it could be done generally.

Air Commander A. V. J. **Richardson** described the significance of the hearing problem in admission tests for the Royal Air Force. The boys were enlisted for life and had a fairly stiff examination to pass at the outset. Of 5750 candidates analysed 0·7 per cent. had been rejected for ear disease. In 1925–32 only five apprentices had been invalided (from some 1200 men) for ear trouble. The explanation of the low figures was probably the greater intelligence of the group from which recruits were drawn. Prompt treatment and daily skilled dressing accounted for the low invalid rate. Inner ear deafness, due to testing engines or flying unprotected, was rare and transient. Air Force men were not kept permanently on noisy trades and permanent damage did not occur. Ear-stops and properly fitting helmets were used. Noise had been found to be a factor in inducing fatigue in flying personnel but was not the only factor. The time-honoured tests were used in testing recruits—largely the whispered voice.

Dr. A. R. **Friel** spoke of the prevention of deafness due to middle-ear disease in school-children. Deafness was commoner in the poorer children, middle-ear disease was not unusual in children under 7, and was nearly always secondary to mouth, nose, or throat conditions, which must also be treated. Conservation of time was of great administrative importance and helped to ensure the coöperation of the relatives; therefore every child should have a precise appointment at the clinic. Zinc ionisation was able to save the situation; in most cases the ear was quite well after two or three visits. Acute cases were given glycerin and carbolic mixture to pour into the ear two or three times a day, keeping the ear filled with it for twenty minutes. The commonest cause of discharging ears after otitis media was tympanic sepsis, followed by external otitis, attic, and mastoid disease. Only the last two were inaccessible to zinc ionisation. In the acute stage the nasal or pharyngeal condition could always be found, but might have disappeared by the chronic stage of the ear condition. Children found blowing the nose difficult, and secretion collected at the back forming a mechanical irritant. Diastolisation was a very important method of treating nasal infection; the nurse or the mother could do it and the results were very good.

Dr. A. H. **Gale** (London) said that from the educational point of view deaf children could be divided into totally deaf, partially deaf (i.e., unable to benefit from ordinary education), and those able to join in general classes but perhaps needing special consideration. The definition of the second group was difficult; the latest figure was 1745 throughout the country (0·35 per 1000), but this was said to be too low. Some authorities would put the incidence as high as 5 per cent. of all school-children. From the educational point of view the hearing of the better ear was what mattered. There was a considerable margin of safety between a defect recorded by the audiometer and a social disability. In the third group the medical aspect was more important than the educational. Increased efficiency in routine inspection could be obtained by a brief examination with an electric auriscope. If the school medical officer detected ear discharge he did all he could be expected to do, but at present many cases were missed. A history of ear trouble taken at a school inspection had shown an incidence of 13·9 per cent. The gramophone audiometer was of great value in detecting cases which could not be recognised by inspection.

Prof. A. W. G. **Ewing** (Manchester) observed that audiometer tests of 27,000 children in Rochester, N.Y., had shown that one child in 76 needed medical and special educational attention for ear defect. The implication was that in this country many cases were being missed. Investigations had been made on the relation between hearing for pure tones and hearing for speech, and the gap between routine tests and everyday hearing could now be bridged. Deafness might not be noticeable to the patient, or to his friends or teachers, until hearing had been very seriously impaired. "Problem" children, with no history of deafness, or children adjudged to be mentally defective or retarded, might prove to have undetected hearing defects which accounted for all the trouble, including speech defects. The whole field of auditory defects appeared ripe for a great advance owing to the revolution in the physics of sound.

Dr. PHYLLIS KERRIDGE reported the result of a test of over a thousand adults who had applied to a commercial firm for hearing aids. There were four chief types: 52 per cent. had maximum loss for high tones, only 5·5 per cent. for lower tones, and 5 per cent. approximately uniform loss, the remaining 37·5 per cent. having loss for middle tones. On the average, 50 per cent. hearing loss equalled 60 decibels of hearing loss, or inability to hear loud speech at an ordinary distance. The figures for deaf children were of the same order. The technique of diagnosis of hearing loss was greatly in advance of that of compensation. Deafness with maximum loss in the middle tones was much easier to compensate than the common type of loss of the higher tones. The National Physical Laboratory was undertaking the difficult tests required.

Major-General P. H. HENDERSON (War Office) discussed the problem as it affected recruiting for the Army. Recruits represented every social class and were probably a fair sample to discuss. Ear trouble was now recorded in the Army records as "middle-ear disease," because this had proved to be the commonest cause of deafness though it might not cause it. ("Deafness" was the old formula.) The drum was inspected in every case, hearing tests being given secondary importance only. Electric auriscopes were used. A series of numbers was read out at 20 feet in a strong whisper, including all ranges of pitch, and each ear was tested separately. In the years 1904–13 the average rejection figure was 3·05 per 1000; in the decennium 1924–33 the figure was 45·45 per 1000. The corresponding figures for discharges (i.e. after enlistment) were 0·42 per 1000 and 5·48 per 1000. This indicated a great increase in the incidence of ear disease, and did not include the many applicants who were rejected by recruiting officers without ever getting so far as medical inspection. There had been a similar increase in other causes of rejection, with the sole exception of the chest measurement, which could usually be brought up to standard by a little instruction in breathing. There seemed to be a grave deterioration in the post-war youth. Some authorities thought the change in figures was due to improved examination; with this view Major-Gen. Henderson, as head of the department concerned, could not agree, but believed the examinations to be less thorough now than before the war. He hoped that things would improve when the present school generation came to recruiting age. Ear disease was the chief cause of rejection of recruits and lost thousands of men for the Army, with the result that the general standard of physique for the Army had to be lowered. The subject was, therefore, of great national importance.

Dr. H. M. S. TURNER (Abingdon) described an apparatus like the audiometer that he had devised many years ago, and the difference he had noted between tone deafness and speech deafness. Some people seemed to be deaf to certain vowel sounds, and if these sounds occurred often in a conversation they thought they were getting deaf and became inattentive; he had called the condition "auditory astigmatism." In his apparatus he had had a switch so that the patient did not know which ear he was listening with; this had proved valuable in detecting malingerers. He commented on the extraordinary complacency with which a running ear was regarded by some practitioners.

The PRESIDENT thought that modern apparatus would greatly improve diagnosis, and this led to treatment. Prevention, however, went back to naso-pharyngeal infection, and possibly to diet. More might be done by early correct dieting than by any other means.

Dr. CROWDEN, in reply, said that certain numbers, like three and one and six, tended to be confused by deaf children. The problem, to be tackled nationally, must be tacked in groups and not individually.

Dr. FRIEL, in answer to questions, said he had never seen any untoward results from the introduction of the diastolisation bougie by a mother; the bougie was usually left in for about five minutes.

PARIS

(FROM OUR OWN CORRESPONDENT)

PROF. LÉON BERNARD

THE death of Léon Bernard at the comparatively early age of 62 was as sudden as it was unexpected. The fatal extension of a dental abscess was a matter only of hours. He combined many qualities. Laboratory worker, clinician, administrator, diplomatist, and orator, he excelled in all these fields, and knew how to fuse his many and great gifts in a forceful and convincing personality. He was at one time professor of public health, and some of his friends wondered why he should have abandoned this chair for that of the newly created chair of tuberculosis. On the face of it, he moved from a wider to a narrower sphere, but whatever public health may have lost by this change, it is certain that the cause of tuberculosis in France owes much of the efficient promotion it has enjoyed during the past decade and more to Léon Bernard. He was tireless. Even at table, on the place where others would put their bread, he placed his telephone, and it was a marvel to those who dined as well as worked with him how ceaseless his activities were; for he remained throughout life a practising physician with an influential clientele and with his own clinic.

PROF. LÉON BERNARD

While Grancher blazed the trail for the welfare of the child exposed to infection at home, providing for his adoption by healthy foster parents, preferably in the country, Léon Bernard went still closer to the root of the matter by organising a system by which the infants of a tuberculous parent could be taken into a healthier environment without the home being broken up. He argued shrewdly that if the tuberculous parent instead of the threatened child be sent away, the home was liable to be broken up by the healthy consort forming new ties in the absence of the tuberculous husband or wife. Léon Bernard gave expression to his appreciation of the Papworth system by introducing it, in a slightly modified form, into France. At the Laennec Hospital in Paris he surrounded himself by a distinguished staff of specialists representing every aspect of tuberculosis work. He was an original member of the Health Committee of the League of Nations, and his association with the International Office of Public Health in Paris brought him many international contacts. Although he scarcely understood spoken English, he frequently visited this country and had a French which nearly everyone understood. A few years ago he succeeded Roux of the Pasteur Institute as president of the Conseil Supérieur d'Hygiène Publique—the highest administrative medical honour in France. He was also secretary to the International Union against Tuberculosis as well as the guiding force in the French National Tuberculosis Committee. He was also a close friend of the Red Cross, both at home and abroad, and his services as an administrator were often required by the League of Red Cross Societies. Not exactly a deep thinker, he had an uncanny ability of sizing things up in essentials and of expressing them faultlessly. A bibliography of his publications would run to several pages. Many of his more recent publications were associated with the names of younger colleagues whose work he had done much to inspire.

His funeral on August 22nd was impressive owing to the number of corporate bodies represented there in their last tribute to a great benefactor. A more permanent memorial may be the establishment in Paris of an international school of advanced studies in hygiene maintained by the State but placed under the authority of the health organisation at Geneva. The project has not gone beyond the formalities of precedure and constitution, but one day it may materialise and be a testimony to Bernard's broad international outlook.

PROBLEMS OF FOOD

THE object of the Food Investigation Board is the improvement of our food-supply. In the 1933 report, Sir Joseph Broodbank, the chairman, says that the Board has always attached the greatest importance to investigations which, putting aside immediate practical needs, aim at increasing the present meagre knowledge of the properties of foodstuffs. Much of the work embodied in the latest report,[1] however, has an immediate application, and there is little to be found in it which does not foreshadow practical advantage in the future.

Fish—Fresh, Thawed, and Pickled

At the Torry research laboratory experiments have been pursued into cold storage of different species of white fish. Fillets of haddock, cod, whiting, gurnard, plaice, and lemon sole were sealed in separate cans, frozen in brine at —20° C., and stored at —21° and —12°. After storage for 4, 6, 8, or 12 weeks the fish were thawed and smoked to a "pale" cure; they are fish which, when fresh, give an equally good cure as regards gloss and translucency, and these characteristics were used as criteria in assessing the effects of cold storage. After six weeks' storage at —21° all the cures were as good as fresh cures, but after 8 to 12 weeks there was a noticeable falling off, except on the part of the lemon sole; at —12° the rate of change was more rapid, all the fish—except the indefatigable lemon sole—giving a cure inferior to a fresh cure after four weeks' storage. The lemon sole, after 12 weeks at —12°, gave a cure that was nearly equal to a fresh cure.

Other work of the laboratory included an investigation of the keeping quality of frozen haddock after thawing. The freshly trawled fish were frozen in brine at —21°, and stored at that temperature for varying periods, ranging up to 6 weeks; they were then thawed in ice. It was found that in most cases thawed fish, after freezing in brine, had browner gills, browner blood, and slightly browner flesh than fresh fish; and that the flesh was usually slightly softer than that of fresh fish for the same duration of storage in ice up to 5 days, though after that there was little difference between the two. But these deviations from normal appearance do not indicate an inferior quality, though there might be some difficulty in marketing the fish in the unfilleted state until this has been explained to the buyers. Neither fresh nor thawed fish acquired the putrefactive smell of stale fish until they had been 12 days in ice, when the characteristic odour was observed to the same extent in both. When thawed fish is to be smoked, smoking should follow immediately upon thawing if a first-class cure is to be obtained.

A short section on the curing of herrings deals with the possibility of obtaining a mild cure which will keep. A hard cure is produced by packing herrings in saturated brine and solid salt. The observers produced a lightly salted brand by soaking herrings in brine without the addition of solid salt. They were undeniably palatable, and the flesh was not desiccated as it is in a hard cure, but after 12 days at a temperature of 10° to 15° C. they were also unmistakably sour, and after 28 days putrid. When kept at 0° C., however, they were sound after 12 days, only slightly sour after 28, and uneatable after 39. At —6° C. they remained sound up to 80 days and are being kept for still longer periods.

Experiments on the growth of micro-organisms indicate that temperatures below —6° C. must be employed if fish is to be kept bacteriologically fresh for any length of time. Studies of the vitamin A in halibut-liver oil show a maximum average content in the spring and a smaller rise in the autumn, in each case following, by about a fortnight, a period when diatoms are especially abundant in the sea.

Some Habits of the Apple

Apples have held a reputation as a mystery fruit since the creation, and they evidently appeal to the curiosity of the Board, for a considerable part of the report is given up to their vagaries. Their study is complicated by the fact that no two strains of apple seem to behave alike. At the low temperature research station the influence of the atmosphere composition upon the incidence of the climacteric in apples has been investigated. The climacteric is "the irreversible change . . . which ushers in the senescent phase of life, and which is accompanied by a marked increase in respiratory activity." Post-climacteric apples rather unfairly evolve a substance which induces the climacteric in other apples which have not yet reached the stage at which it is auto-induced; so that when apples are stored together, as soon as one reaches the climacteric the whole company are affected, whereas, if similar apples are stored in separate containers the self-induced climacterics are spread over a considerable period. As an early climacteric is associated with a short storage life it is important to find some method of storage by which the climacteric is delayed. The observers found that when Bramley's seedling apples—the most important English cooking apples—in the late pre-climacteric stage were exposed to an atmosphere of pure oxygen at 18° C. the incidence of the climacteric was considerably accelerated, but that subnormal concentrations of oxygen delayed the climacteric. Studies have also been made of the respiratory activity of apples in the presence of atmospheres containing the normal 21 per cent. of oxygen, but variable quantities of carbon dioxide. Sturmer pippins were used, and it was found that, with apples in the post-climacteric phase, at 10° C., respiratory activity was depressed by a 5 per cent. concentration of carbon dioxide in the atmosphere, and depressed still further by 10 per cent. In the pre-climacteric phase carbon dioxide seemed to exert no marked effect upon respiration, but it had the effect of delaying the climacteric considerably—a finding which naturally has an important bearing on the gas-storage of fruit.

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[1] Report of the Food Investigation Board for the year 1933. H.M. Stationery Office. Pp. 248. 4s.

Problems of gas-storage are also being studied at the Ditton laboratory, where routine trials have been made with monarch, Cox's orange pippin, Blenheim orange, and Worcester pearmain. The divergent behaviour of different strains of apple may be noticed in their results, but at least there is enough uniformity for the observers to state that for these four varieties of apple the best results were obtained when both the oxygen and carbon dioxide content of the atmosphere were low—usually in the proportions of 2·5 per cent. of oxygen and 5 per cent. of carbon dioxide. In dealing with Cox's orange pippins the development of the characteristic flavour is the chief consideration. The observers found that though gas-storage retards the development of this flavour it does not destroy it; when the apples had been stored under the favourable atmospheric conditions described above, the full flavour did not develop until they had subsequently been kept in air at room temperature for several days. The importance of these gas-storage experiments can be estimated from the fact that there are now 12 commercial gas-stores for apples operative in England, and several more are being built. They have been designed primarily for Bramley's seedlings; with these the optimum storage atmosphere can be obtained by allowing the apples themselves to generate the necessary carbon dioxide, its amount being controlled by ventilation. Unfortunately this is not a plan which can be followed with most varieties of apple, but the problems of construction which the gas-storage of various strains involves are now being studied.

An inquiry into the vitamin C content of canned apples, carried on at the low temperature station, showed that the removal of the peel before steaming was responsible for a great loss of vitamin during canning. Kohman, Eddy, and Carlsson had previously shown that apples soaked in 2 per cent. salt solution for 18 hours before canning retained their vitamin; but this process makes the canned apples rather insipid and salt to the taste. The workers at the research station found that if apples were cored but not peeled, immersed for a short time in brine to keep them from turning brown, steamed on a hair sieve for 3 or 4 minutes, canned, and then cooked, in the can, for 25 minutes in boiling water, the finished product contained about as much vitamin C as the unpeeled raw apple. Canned apples are not a thing one hears of people eating much in this country, but it is gratifying to know that they can be so efficiently prepared should the demand arise.

Curing of Bacon

Experiments on bacon-curing have been continued at the research station, and in view of the reorganisation of the pig industry a special study has been made of tank curing. Tank pickle contains 25 to 28 per cent. of salt and from 3 to 4 per cent. of saltpetre, according to the recipe followed, but before it can be employed for curing it must be matured by using it to salt heads or small pieces of meat. When mature it contains, in addition to salt and saltpetre, a trace of nitrite, and hæmoglobin and proteins which have diffused out of the meat. Mature pickle can be used over and over again; when a batch of sides is removed from the tank the pickle is found to be more dilute and to have increased in volume, and the strength has to be maintained by the addition of salt and saltpetre before each new batch of sides is put in. The concentration of nitrite and proteins remains fairly constant.

An investigation was also made into the penetration of salt, both by tank curing and dry-salt curing. The electrical resistance decreases as the concentration of salt increases, and can accordingly be measured. In curing Wiltshire sides the interior of the lean meat is injected with pump-pickle before being salted or immersed in the tank. The salt was found to penetrate far more quickly in the pumped sides than in unpumped controls, both in dry-salt and tank curing, and moreover the salt was much more evenly distributed in the mature bacon in sides which had been pumped. Penetration of salt was much more rapid in a lean than in a fat side. Experiments on gas-storage were also carried out on pork and bacon; a side of tank-cured bacon, stored at 0° C. for 18½ weeks in an atmosphere of carbon dioxide, when exhibited in an unsmoked state at Smithfield was pronounced to be hardly distinguishable from fresh bacon. Other sides, A_1 and A_2, from the same pig were dry-salted and stored unsmoked at $-3°$ C.; another pair, B_1 and B_2, were frozen at $-35°$ C. and stored at $-10°$ C. Sides A_1 and B_1 were stored in air, A_2 and B_2 in carbon dioxide. After 8 months they were all taken out of storage and smoked. Both A_1 and B_1, stored in air, were badly dried out and the fat was rancid. There was no rancidity in A_2 and B_2, and they were indistinguishable in appearance from fresh bacon.

Other activities reported by the Board are concerned with respiration in the potato, storage of soft fruits, bacteriological problems of storage, disease in fruit, post-mortem changes in the haddock, biological engineering and engineering problems connected with apparatus, and investigations on meat and its storage. Gas-storage has proved as valuable for meat as for other perishable foodstuffs, and enables meat to be stored at temperatures which preclude the formation of ice in the tissues—a problem of cold storage which has long exercised the trade.

Though the results of many of the inquiries have a universal application, others—notably the investigations on fruit—have little bearing on the problems of overseas producers who are working under quite different conditions. Each area of production must undertake its own research—it cannot be done elsewhere. "Work of this kind," Sir Joseph Broodbank says, "is slow, costly and unimpressive, but it is necessary."

PUBLIC HEALTH

ADULT SERUM IN THE CONTROL OF MEASLES

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DURING the biennial epidemic of measles which began in November, 1933, an unusually large crop of cases admitted to the Mogden Isolation Hospital proved to be incubating this disease while suffering from another. Accommodation at the hospital is short, and, as it will be so until the newly formed joint board for South-West Middlesex commences to function, it is important to keep the wards fully open. Steps were taken, therefore, to limit the spread of measles within the hospital by protecting susceptible children.

At first, thanks to Dr. R. A. O'Brien of the Wellcome Physiological Research Laboratories, a few doses of convalescent serum were obtained. Five doses of adult serum were also obtained from Dr. D. N. Nabarro at Great Ormond-street Hospital. Soon, however, we had to look for a source of supply of our own, and the District Commissioner of Boy Scouts was asked to obtain volunteer donors of blood among the rover scouts who had had measles. Three volunteered at once, and about 1200 c.cm. of blood were obtained. This was sent to Dr. O'Brien who kindly carried out the necessary tests and put the serum up in ampoules ready for use. When the stock ran low another appeal was made, and three more volunteers came forward with equal readiness. This time a rather larger quantity was obtained.

It will be noted that the doses of adult serum have as a rule been moderate in comparison with the dosage recommended in the L.C.C. report[1] on the measles outbreak of 1931–1932. No sliding scale of dosage according to age was used by us. The average dose given was about 10 c.cm. Possibly our younger class of donor may be found to give a more potent serum, but we feel that it ought to be possible, when protecting children brought up under ordinary urban conditions, to count upon some degree of immunity gradually developing with age, and thus to avoid giving the larger doses recommended for older children. No attempt was made in any of the cases to produce a modified attack, as especially in the hospitals it was desirable to secure complete protection. All injections save one were given on the third or fourth day of exposure.

TABLE I.—*Convalescent Measles Serum*

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	1 6/12	4	22/11/33	Protected, but had measles 6/1/34.
F.	2½	5	22/11/33	Protected.
M.	7½	6	22/11/33	,,
M.	12	10	22/11/33	,,
M.	1	5	6/1/34	,,
M.	7	5	30/12/33	,,
M.	5	5	30/12/33	Modified measles 12/1/34.
F.	2	5	15/3/34	Protected.
F.	5	10	6/11/33	,,
M.	3½	6	6/11/33	Typical measles 21/11/33.
M.	4½	8	7/11/33	Protected.
M.	3	5	22/11/33	,,
F.	6	10	6/11/33	Protected, but had measles 25/12/33.
F.	1½	5	6/11/33	Protected.
M.	6	10	6/11/33	,,
F.	11	10	30/5/34	,,
M.	5 11/12	5	30/5/34	,,

TABLE II.—*Adult Measles Serum*

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	10/12	6	22/11/33	Modified measles 6/12/33.
F.	7 3/12	14	22/11/33	Protected.
M.	3 6/12	12	22/11/33	,,
M.	2	10	18/1/34	Modified measles 20/2/34 (note date*).
F.	5	10	18/1/34	Protected.
M.	4	10	15/2/34	,,
M.	4	10	15/2/34	,,
F.	3	10	22/2/34	Modified measles 14/3/34.
M.	14	10	15/2/34	Protected.
M.	2	10	1/3/34	,,
F.	5	10	1/3/34	,,
F.	5 6/12	10	22/2/34	Modified measles 27/2/34 (note date).
F.	3 6/12	10	14/3/34	Protected.
M.	3	10	14/3/34	,,
M.	4	10	15/3/34	,,
F.	4	10	14/3/34	Modified measles 23/4/34.
M.	12	10	11/4/34	Protected.
F.	3	10	15/4/34	Modified measles 23/4/34.
F.	5	15	26/4/34	Modified measles 4/5/34.
M.	12	15	26/4/34	Protected.
M.	3	15	26/4/34	Modified measles.
M.	5	12	22/11/33	Protected.
M.	5	20	2/6/34	,,

* In this the period of protection under our definition was exceeded by three days, but the case is classed as unprotected but modified.

TABLE III

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	14/12	10	4/5/34	Protected.
F.	6	10	19/2/34	,,
F.	11	12	19/2/34	,,
F.	9/12	7	19/2/34	,,
M.	3/12	3	24/2/34	,,
M.	4	10	1/3/34	,,

The tables show the results obtained in the individual cases. The cases listed as modified are those in which the patient was never really inconvenienced by the disease, having little or no rise of temperature or catarrh, and a pale rash.

During the outbreak in the children's ward of the Hounslow General Hospital, adult serum was used in six cases. All were completely protected. The ward was not closed (Table III.).

Doses of adult serum were also given to three children in private practice, and a dose of convalescent serum to one. All were protected. These cases were not isolated from the source of infection.

Principally as a result of the action of the rover scouts it was possible for the first time on record to keep the isolation hospital and the children's ward open throughout a severe epidemic of measles. During the previous outbreak of measles one of the scouts had to be refused admission to the hospital for acute appendicitis as the ward was closed on account of measles.

Each batch of rover scouts was presented by the mayor at a public council meeting with an illuminated certificate of appreciation over the official seal, and we wish personally to place on record our own indebtedness to them. Our thanks are also due to Dr. C. D. Meadowcroft for taking the blood from the volunteers.

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[1] London: P. S. King and Son. No. 2996. 2s. 6d.

SUMMARY

Taking as a standard of complete protection freedom from the disease for one month the results are as follows :—

Convalescent Serum (18 cases).

Complete protection .. .. (1 measles six weeks after injection)	16
Complete failure	1
Modified attack	1

One boy was exposed to infection at home five weeks after injection and completely protected.

Adult Serum (32 cases).

Completely protected .. .. (1 modified case five weeks after)	25
Modified cases	6
Modified case five days after injection—i.e., too late for full protection to be likely	1

Standards of Malnutrition in School-children

COUNTY school medical officers have much opportunity of assessing malnutrition in elementary school-children. Dr. W. G. Booth, reporting to the Lincoln (parts of Holland) council gives a comparative table which shows unmistakably the immense improvement of average physique in his area in the past twenty years. He is in a strong position, for it was in his county that Dr. A. W. Tuxford established his well-known standards in the three years preceding 1914. Exactly similar measurements and calculations have been carried out for 1933 by Dr. N. J. England.

Age.	Height (inches).		Weight (lb.)	
	1910–13.	1933.	1910–13.	1933.
Boys 5½ ..	41·4	43·0	39·5	42·4
Boys 12½ ..	55·4	56·8	74·9	80·1
Girls 5½ ..	41·0	42·9	38·3	40·5
Girls 12½ ..	56·2	57·7	76·5	81·4

The average boy is now 4 per cent. taller and 7 per cent. heavier than 20 years ago ; the girl's increase is little less. Dr. England remarks that, judged by the standard of to-day, the normal child of 1913 would be regarded as a case of malnutrition (at all events undersized). For this alteration in physique Dr. Booth can find many causal factors. First the wages of the agricultural labourer are about twice as high as in 1914, while the cost of living is not 50 per cent. up, and the average family is smaller. Yet the present-day labourer has little enough money, for the prices of foodstuffs in his area are higher than in industrial areas, a fact which (Dr. Booth adds) "lends considerable support to the view that the rental of agricultural labourers' cottages must be kept at the lowest possible level if the nutrition of the family is not to suffer." No credit can be given to the school medical service for the change, since the improvement in physique takes place before the children attend school and is only maintained during school years. He does not however discount the influence of education on the mothers who have been led to a realisation of the importance of proper feeding, while the deeper interest in the welfare of children by all classes of society "has had a far-reaching effect upon wages, housing, sickness and every form of communal advancement." Much of this enlightenment, we cannot help feeling, has had its origin in the knowledge of health that has developed in the schools as a result of the existence of a school medical service.

In Cumberland Dr. Kenneth Fraser says that investigation does not reveal increased incidence of malnutrition. The number of cases reported in 1933 was 137 as opposed to 45 in 1932, but he does not think these figures are of great significance. He writes :

> "In the first place, out of a school population of something like 25,000, the percentage increase is very small indeed ; but, apart from that, when any particular subject is in the air more cases are classified accordingly than under normal conditions. This is a psychological fact from which the school medical officer is not free any more than is the man in the street. The trouble of the whole matter, of course, is that malnutrition is not a definite disease like diphtheria or deafness, but is largely a matter of individual opinion. There are no standards of comparison, and when one says that there is no increased incidence of malnutrition one is saying no more than that the physical appearance of the children, their height and weight, their muscular tone, their colouring, appear more or less normal."

Later in the report however he admits that the evidence is not altogether satisfactory, for there has been an increase in the incidence of rickets in young children and in the number of cases of chronic inflammation and ulceration of the eyes—examples (he adds) "par excellence" of the results of malnutrition. That the children have stood the period of economic distress as well as they have is largely due to provision of extra nourishment and milk and to supervision by welfare centres and other agencies.

Dr. C. Franks (Durham) has an interesting note on the "time lag" between a return to employment and any improvement in the nutritional condition of the family. Dr. O. Sullivan (Northumberland) has found that, while defective feeding in adolescence may leave a legacy of physical impairment which persists throughout life, a striking rectification may occur after puberty ; these years may, he suggests, be regarded as a "period which affords great possibilities of physical regeneration, especially if the tide of growth is taken at its flood."

In Hampshire Dr. H. L. Cronk reports in detail on 110 cases of malnutrition, of which the causes were found to be per cent. : fatigue and inadequate rest 20, recent illness 13, incorrect diet 18, oral sepsis 15, unknown 33. In four cases only could it be attributed to poverty. In East Sussex Dr. W. R. Dunstan has for several years made a special study of the ratio between heights and weights of children. He thinks that by the use of tables (and he is a recognised authority on the method) the actual weight at any height can be compared with the standard weight and thus wide variations from the normal are easily detected and a "preliminary sieve" is obtained. In his view any child with weight as much as 7–9 per cent. below the normal should be weighed quarterly and if the deficiency is over 10 per cent. the case should receive special investigation.

In the Isle of Ely Dr. T. C. Lonie has carried out a statistical survey of height, weight, and nutrition, using the tables of Tuxford, Dunstan, and others, and finds that both in height and weight the children of the area are above the standard. He considers that for the measurement of nutrition, comparative tables of heights, weights, and age are valuable, but that a satisfactory height-weight ratio is not enough. The well-nourished child, he says, has also other characters.

> "His posture and general physique are good, his body well covered but not fat, his muscles firm, his skin elastic,

and of good texture, his hair smooth, glossy and of good amount, his organs sound and circulation good; clear of eye and with a bright expression; alive and alert in body and mind. It will be seen, therefore, that there are many respects other than those of height or weight wherein a child may fail to reach the ideal of fitness, and since each of these particulars is capable of being modified by diet, those children who fail to reach the standard may be considered to suffer in some respects from malnutrition and as such to be in need of treatment."

In Kent Dr. J. Selfe divides the under-weight child into seven classes: (1) Normal thin child; (2) Indigestion; (3) Throat infection; (4) Rheumatism; (5) Tuberculosis; (6) Chronic (non-tuberculous) chest trouble; (7) Diabetes and *B. coli* pyelitis. It is certainly important that all who see under-weight children should remember how many other reasons besides lack of food there may be for deficiency in weight, not forgetting the constitutionally thin child who has his own optimum weight.

In Notts Dr. P. H. Deeny has carried out a thorough investigation of 461 children reported by teachers as possibly suffering from malnutrition due to underfeeding. For height-and-weight ratios he used Tuxford's formulæ, not of course gauging the presence or absence of malnutrition by these alone. He found no evidence of widespread malnutrition due to lack of food; in a school population of 49,000 there were only 29 such cases and in these the condition was aggravated by fatigue and ill-chosen diet. The need for instruction of parents in food values appears to him urgent.

Dr. J. N. V. Potts (Yorks, West Riding) finds the Quetelet standard $\frac{100W}{H}$ is the most trustworthy index of malnutrition but not by itself adequate as a guide; his practice is for two examiners to work over the same children to check standards and he has found that the agreement is remarkably close.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 18TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1973; diphtheria, 992; enteric fever, 31; acute pneumonia (primary or influenzal), 368; puerperal fever, 45; puerperal pyrexia, 103; cerebro-spinal fever, 10; acute poliomyelitis, 18; acute polio-encephalitis, 6; encephalitis lethargica, 7; dysentery, 11; ophthalmia neonatorum, 75. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Inf [illegible] Hospitals of the London County Council [illegible] is as follows: Small-pox, 0; scarlet fev [illegible] 1399; measles, 415; whooping-cough [illegible] r, 20 mothers (plus 7 babies); encephalitis lethargica, 269; poliomyelitis, 4; "other diseases," 261. At St. Margaret's Hospital there were 16 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 12 (2) from measles, 3 (0) from scarlet fever, 12 (1) from whooping-cough, 30 (4) from diphtheria, 49 (13) from diarrhœa and enteritis under two years, and 12 (3) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the only death from enteric fever. Whooping-cough was fatal in 5 cases at Liverpool. Liverpool also reported 5 deaths from diphtheria, Birmingham 4. Birmingham with 7 showed the highest deaths from diarrhœa, Liverpool following with 4.

The number of stillbirths notified during the week was 264 (corresponding to a rate of 38 per 1000 total births), including 45 in London.

MEDICINE AND THE LAW

Coroner's Jury and Witness

At a Hammersmith inquest this week, where a death apparently due to a traffic accident was being investigated, the deputy coroner found himself obliged to discharge the jury and to adjourn the proceedings to another day. This was because one of the witnesses had been seen talking to members of the jury outside the court. A solicitor's clerk reported the irregularity to counsel engaged in the case, and counsel protested to the deputy coroner. It was not clear that the witness had been practising advocacy or indeed doing more than pass the time of day in conversation, but the incident was rightly described by the deputy coroner as capable of unfairness. Without attributing any sinister intention to this particular witness, we can all appreciate that jurors ought to give their verdict upon evidence heard in open court and not otherwise. Lately, it is believed, the authorities at the Central Criminal Court have been disquieted by suspicions that persons have attempted to tamper with juries at criminal trials; if the fears are well founded, it is a grave matter. Yet, as legal historians have satisfied themselves, it was not always the rule that juries must hearken only to the evidence of publicly examined witnesses. Our jury system traces its pedigree back to the assembly of neighbours who in Norman times were made to give answers on oath out of their own knowledge to questions (usually relating to revenue) administered to them by officers of the Crown. Somehow, by steps which are not conspicuous, a declaration based on personal knowledge of local events was converted into a verdict based on the formal evidence of witnesses. In 1670 Chief Justice Vaughan laid down in Bushell's case the rule that a jury could not be punished for giving a perverse verdict contrary to the evidence. One of his reasons, he explained, was that the jury may have personal knowledge which will assure them that what they hear in court is untrue. Gradually, during the eighteenth century, the modern principle was established. By 1824 a text-book writer was able to state confidently that a juror could not give a verdict founded upon his own private knowledge, although in 1836 (in R. *v.* Rosser) Baron Parke was obliged to admit that it was impossible to prevent a jury in a criminal case from making use of its general knowledge. The coroner's jury seems to provide a missing link in the development of the modern blank-minded juror from his predecessor who was specially selected because he already knew everything without hearing evidence. At any rate there is a curious survival in the oath of the juror at an inquest as prescribed in the Coroners Rules of 1927 (following the Act of 1887 which in turn had followed much earlier precedents). He swears that he will "diligently inquire" and that he will give a true verdict according to the best of his skill and knowledge as well as according to the evidence. The language seems to be a relic of the ancient practice of the Norman period. Yet, inasmuch as coroners have long ago evolved a stabilised judicial technique of examining witnesses and of summing up their evidence to the jury, it is obvious that a juror at an inquest cannot nowadays be encouraged to prosecute his own inquiries outside the court or to discuss the case with a witness in an informal way.

CORRESPONDENCE

PUBLIC EXHIBITIONS OF CRUELTY

To the Editor of THE LANCET

SIR,—In your leading article of August 18th, entitled the Death Penalty and the Public, an interesting point is raised with regard to the influence of executions on the public at large. We read that

> "the sufferings of murderers and their families are still used for public entertainment [by the press] . . . and the sadistic element which is to be found in everyone, normal or abnormal, is regularly exploited in this way, in the name of the State and for the sake of large circulations."

Prima facie, such exploitation will probably strike us as undesirable, degrading, and calculated to increase those sadistic tendencies in all of us which we may deplore but cannot deny. Have we any real evidence, however, that such appetite does in fact grow by what it feeds on ? Is it not rather that sadism tends to become canalised in channels which may be either superficially obvious or deeply hidden, and that sadists (made, like Jesuits, in the nursery) are a menace or an asset to society according as to how successfully their tension is released ? If we consider the professional sadists (amongst whom I would include surgeons, butchers, and those who hunt the fox more than three days a week), we may, and indeed generally do, observe in them a certain grossness and blunting of the finer feelings, but we can hardly claim that they are any more cruel in their social relationships than, shall we say, the average film star or street hawker, whose professional rôle is (presumably) to please.

The present age has brought to a fine art the practice of being kind only to be cruel, and by the studied removal of those outward and visible signs of brutality and violence, in the witnessing of which the average man can release his sadism, we are simply forcing personal and mass cruelty to find other and often incalculable means of satisfaction. It would perhaps be far-fetched to diagraph the decrease in bear-baiting and cock-fighting against the overwhelming increase in divorce, but there can be little doubt that the present century, for all its apparent dislike of open brutality, has witnessed a world war and, in a highly civilised country, a series of official pogroms and murders almost without parallel since the Middle Ages, because in each case the community was psychologically "ripe" for such things to happen. So far, one comparatively harmless outlet has been left unobstructed, and the reading public (with that unerring instinct with which a child starved of sweets makes up for them with bread) has very properly indulged in an orgy of murder, horror, and "war" literature. There is a kernel of truth in the comment:

> The War we suffered not so long ago
> Now makes an excellent *Grand Guignol* show,
> Which earnest youths enjoying cheap sensations
> Call "Propaganda for the League of Nations."

Until we can produce a change of heart in future generations, not by emasculating films or by hearing murder trials in camera, but by a saner and more sympathetic attitude to the infant and child; and by such long-period psychological experiments as those suggested by Dr. Edward Glover (in his book, "War, Sadism, and Pacifism"), we should probably do better to allow the comparatively harmless indulgence of sadistic appetites in public exhibitions of cruelty than to attempt to suppress them. Meanwhile, I for one shall continue to read Edgar Wallace and to attend the all-in wrestling matches at the "Ring" from a stern sense of duty, in the hopes that by so doing I shall save my unconscious the necessity of clapping on the fomentations dangerously hot, or of strangling my last duchess, or of causing my children's feet to stumble at the head of the cellar stairs. And though it is doubtless too late to put back the clock, I should warmly welcome the reintroduction of public executions that the watchers might be purged through pity and horror.

I am, Sir, yours faithfully,

August 20th. EGENS MAURIS JACULIS.

HYPEREMESIS GRAVIDARUM

To the Editor of THE LANCET

SIR,—In her admirable Ingleby lectures on the toxæmias of pregnancy (in your issues of August 11th and 18th) Dame Louise McIlroy describes hyperemesis gravidarum as a symptom of severe toxæmia, to be distinguished from frequent or prolonged vomiting in early pregnancy, which she ascribes to carbohydrate deficiency associated with an anxiety neurosis. She has, however, brought forward no evidence to shake the belief I first expressed twenty years ago that excessive vomiting beginning in early pregnancy is always due to hysterical exaggeration and perpetuation of the morning sickness which occurs in 50 per cent. of normal women, and that there is no dividing line between such cases and hyperemesis gravidarum, the so-called pernicious vomiting of pregnancy. The symptoms and signs which are supposed to indicate the presence of profound toxæmia are, I believe, simply the result of starvation and dehydration, and the artificial termination of pregnancy only acts by suggestion, as the patient naturally expects to recover when what she regards as the cause of her vomiting is taken away.

Dr. J. S. Fairbairn in supporting my views on the subject in 1920 stated that he had not required to terminate pregnancy for vomiting during the previous ten years, and Dame Louise McIlroy has had the same experience in the last ten years. I feel sure that in both cases this is due to the success of the psychotherapy practised in the early stages, in the absence of which severe cases of hyperemesis would have been very much more common, as no less that 60 fatal cases occurred in England in 1930 compared with 38 in 1910 and 34 in 1920. I fancy that Dame Louise really agrees with me, though she has not the courage of her convictions, as she concludes her discussion of hyperemesis gravidarum by saying that success in treatment depends upon "the assurance given to the patient that she has nothing to fear and that she will get well," and that without psychological treatment dieting would be ineffectual.

I feel sure that the psychotherapy is the only essential part of the treatment. I cannot understand the object of giving a patient, who is already suffering from the effects of starvation, nothing by mouth for 24 or 48 hours, nor can there be any need for gastric lavage which can only act by suggestion in the absence of pyloric obstruction or severe gastritis. I doubt whether there is ever any need for special dieting. Twelve years ago I reported in your columns (THE LANCET, 1922, i., 528) the following case :

A woman of 32 was admitted into hospital at the end of the third month of pregnancy. She had vomited all her food since the third week and during the last ten days had retained no fluids. She was very emaciated, her skin was dry and inelastic, and her tongue was dark brown and very dry. Her pulse was 136. The ammonia index of her urine was 28 compared with the normal of 5;

according to Whitridge Williams an increase to 10 per cent. "affords an urgent indication for the prompt termination of pregnancy." In spite of being given fluid by rectum and none by mouth the vomiting persisted. She told me that when she began to vomit her father had said: "You will have a bad time of it, as your mother vomited all the time she was carrying you." I explained to her that there was no real reason why she should have continued to vomit after the first six weeks, but that what her father had said had suggested the idea that the vomiting would continue, and such a suggestion, coming at such a time, was all that was needed to lead to the condition she was now in. We talked about her illness for ten minutes, at the end of which I had succeeded in convincing her that she would not vomit again. I then watched her eat some toast and tea which she had chosen for her first meal. She felt no inclination to vomit. She had a good supper, but vomited her breakfast next morning. She was then transferred to my ward, and had meat and pudding for dinner which she kept down. Except for a slight tendency to vomit after breakfast a week later she had no further trouble, and left the hospital a month after admission having gained 16 lb. in weight. The ammonia index fell rapidly to normal, and the diacetic acid, which had been present in large quantities, disappeared. The pregnancy ran a normal course and a healthy baby was born at full term.

Only those who have watched such a case as this can realise the amazing way in which all signs and symptoms of severe toxæmia disappear when the patient is persuaded to take and to retain an adequate supply of food and fluid.

I am, Sir, yours faithfully,

New Lodge Clinic, August 26th.   ARTHUR F. HURST.

THE SURGEON AND THE GUNMAN

To the Editor of THE LANCET

SIR,—The facts with reference to the treatment by Dr. Clayton May of Dillinger are as follows. Dr. May was not sent to the Penitentiary for failure to report the dressing of Dillinger's wound. He had a perfect right to do this. But after dressing the wound he took Dillinger and two associates of the gunman to a private apartment and kept them there for a week while the authorities were hunting for them. He was sent to the Penitentiary for aiding a criminal to avoid arrest, and the housekeeper of the apartment was sent to the same place on the same charge.—I am, Sir, yours faithfully,

FRANKLIN R. WRIGHT, M.D.

Minneapolis, U.S.A., August 17th.

MEDICINE AND DENTISTRY

To the Editor of THE LANCET

SIR,—The suggestion made by Mr. Meynell Pearson in your issue of August 11th (p. 334), that the alleged shortage of dentists should be made good by newly qualified doctors gradually learning the elements of dentistry by association with dental surgeons in their private practices, ought not to pass unchallenged. It is true that the Dentists Act, 1921, allows doctors whose names appear on the Medical Register to practise dentistry. Since dentistry must be regarded as a special branch of medicine it would have been illogical to debar them. But its highly technical nature makes it incumbent on the doctor who wishes to practise as a dentist to take out a course of study at a dental school. He need not take the L.D.S. examination; on the other hand, unless his name appears on the Dentists Register he would be under a grave disadvantage, for he would not be entitled to undertake any work for members of approved societies—and this work forms an increasingly important proportion of the practices of the majority of dentists.

The course for the L.D.S. covers four years. A doctor by virtue of his medical qualification is exempt from the study of general subjects, such as anatomy, surgery, and medicine, and from examination in those subjects. He is only required to work at a dental school for two years and to take the examinations in dental subjects. As a teacher and examiner for many years I can assure Mr. Pearson that a doctor who wishes to take up dentistry has to work hard during these two years in order to attain a standard of technical ability sufficient to pass his examinations and to practise dentistry with any hope of success. Is it likely that the casual crumbs of knowledge which could be picked up from an "established" dentist, presumably in busy practice, could turn a doctor into a dentist capable of carrying out his work as such efficiently and with benefit to the public? If so why not revert to the old system of apprenticeship?—I am, Sir, yours faithfully,

Brook-street, London, W., August 24th.   A. T. PITTS.

DOES THE PUNISHMENT FIT THE CRIME?

To the Editor of THE LANCET

SIR,—I should like to support Dr. Phillipps's suggestion that the law regarding mental aberrations should be amended. I am a little sceptical regarding the theory of exhibitionism being due to enlargement of the prostate; it is, I think, more likely to be caused by the regression which occurs in senility. No matter what its cause, it is, as Dr. Phillipps says, intensely cruel to punish these old men—some of whom have lived distinguished lives—with imprisonment. Similarly, I believe that perverts, particularly if they are young, should have the benefit of psychological treatment before they are abandoned as hopeless, and even then prison does not seem the right place for them.

There is another side of the question of mental aberration which is equally neglected although equally important. I know of a case of a mentally unstable girl who accused a man of attempted rape. He was tried and sentenced to some months' hard labour. On a number of occasions afterwards this girl accused men of similar behaviour, but was found on each occasion to be virgo intacta. She is now suffering from schizophrenia.

The ignorance of some who should know better is appalling. I have a cutting of an inquest which occurred a few months ago. A man was found to have gassed himself while wearing woman's clothes. The coroner said "the condition in which the man was found was so abnormal as to be beyond his comprehension"—but it would not have been beyond the comprehension of a psychiatrist, and the necessity of having a consulting psychiatrist for such cases is obvious. If those who administer the law are so ignorant of psychological matters can we hope that those who make them will have any more insight? It seems that the only way to bring about a change in the law is for medical men to reiterate the necessity of changing it.—I am, Sir, yours faithfully,

London, August 28th.   CLIFFORD ALLEN.

To the Editor of THE LANCET

SIR,—Dr. Phillipps has done good service in drawing attention to a very important and far-reaching subject. The condition exists and it should be recognised as a disease and not a crime. Many years ago, when I was sitting on the bench, a case convinced me of its existence. A man, probably in the middle sixties, married with a large family, and belonging to the lesser gentry class, was charged with indecency in a public place. The charge was that, late at night, the accused had entered a urinal, had passed the penis through an opening in the eroded iron work, and stood with it there. Curiously the urinal was situated within a short distance of the police office. Attention was called to the circumstances and the man was charged at the next meeting of the magistrates.

The chief constable said he felt compelled to bring this case before the court; there were other cases known to him but he did not wish to mention them. A caution and a fine was inflicted. Within a short period the man was again charged with exposure. No doubt the sitting magistrates would double the fine and further threaten him. The family, however, realising the unfortunate position in which the head was placing them had a strict guard placed upon him, and he troubled the court no more. Before he was gathered to his fathers, to my surprise his family doctor asked me to see him in consultation. I give the bare facts of the case, without comment, in support of Dr. Phillipps's theory.

I am, Sir, yours faithfully,

August 18th. A MEDICAL MAGISTRATE.

GROUND TEMPERATURE AND EPIDEMIC DISEASE

To the Editor of THE LANCET

SIR,—The research on summer enteritis of children in which I assisted the late Dr. de Rienzi Morgan (Morgan's No. 1 bacillus) in 1906–07, established the fact *that the epidemic did not appear until* the 4-ft. earth thermometer registered 56° F. This fact may have a bearing on the recent outbreak of so-called Wimbledon throat, in view of the June average of 56·5° F. registered at Kew this year, being 1·4° F. above the normal. In a very courteous reply to my inquiry the Director of the Meteorological Office has sent me the mean values of ground temperature for England and Wales during the three summer months in conspicuously warm years, and these I hand on for the information of your readers.

Year.	June.	July.	August.	Average of three summer months.
	°F.	°F.	°F.	°F.
1899	55·8	59·6	62·1	59·2
1911	55·9	58·8	61·7	58·8
1921	55·8	60·1	60·4	58·8
1933	56·0	59·5	61·1	58·9
Normal.	54·7	57·7	58·8	57·1

I am, Sir, yours faithfully,

A. WHITE ROBERTSON.

Welbeck-street, W., August 20th.

A PROTEST

To the Editor of THE LANCET

SIR,—An article appears in the *Evening Standard* of August 14th in which my name is freely mentioned, with an *old photograph incorporated. I should* like to assure members of the medical profession *that not one single word on this or any other subject* has been communicated to any representative of the *Evening Standard* by myself or my two secretaries. I wish to make it quite clear that the article and photograph were published without either my knowledge or consent.

I am, Sir, yours faithfully,

Harley-street, W., August 18th. H. D. GILLIES.

MUSHROOM POISONING

To the Editor of THE LANCET

SIR,—The mushroom season is now with us and already one case of poisoning has occurred. In this connexion the observations of Fabre are worth recording. Briefly he states ("The Life of the Fly"; trans. by De Mattos) that in the district of Serigan where he resided for 30 years he never heard of a case of poisoning from mushrooms; that he attributed this immunity to the custom of the peasants of boiling all fungi in salt and water as a preliminary preparation; that the peasants ate indiscriminately all fungi, even those reputed to be poisonous; that he, together with friends, had proved the correctness of this by themselves eating the same poisonous fungi so treated. I met a man collecting "Jews' ears" in this neighbourhood who told me that they always soaked them in salt water before preparing them for the table.—I am, Sir, yours faithfully,

Easterton, Wilts, August 25th RICHARD LAKE.

IONISATION OF THE UTERUS

To the Editor of THE LANCET

SIR,—In your report (p. 376) of my paper read at the B.M.A. section of electro-therapeutics the substitution of "discharge from the cervix" for "discharge from the *uterus*" has altered the entire meaning of my communication. Treatment of the cervix by zinc or copper electro-deposition is a ready means of cure of discharge which originates from the cervix.

When the discharge comes from the body of the uterus treatment may be very difficult, because much patience and skill are required in order to pass the *electrode up beyond the inflamed cervical canal.* But this can be accomplished and, where no source of discharge is present beyond the uterus itself, cure is certain. I am, Sir, yours faithfully,

Devonshire-place, W., August 23rd. AGNES SAVILL.

ADMINISTRATION OF FLUID IN GALL-STONE SURGERY

To the Editor of THE LANCET

SIR,—Mr. E. R. Flint's article on the problems of gall-stones *in your issue of August 18th* concludes with the following astounding sentences:—

> "I have had a considerable experience of this [the intravenous method], and for those cases which really require fluid I am certain it has very great advantages over any other parenteral method; 50 pints can be given without trouble in 4 or 5 days, and is for the most part retained, since there is no obvious sweating or proportionate increase in urinary excretion."

The following criticisms of these statements are so obvious that one is diffident about making them:

1. The only advantage which the intravenous method has over other methods is the rapidity of the addition of fluid—its main disadvantage is the extremely rapid elimination of fluid which has been added. It is also the only method by which such *enormous quantities of fluid* could be added to the blood stream, but such quantities are never necessary. *If there is true dehydration* five pints are as effective as fifty.
2. There are other paths for the elimination of water from the body besides the kidneys and skin.
3. Perception of "obvious sweating" is not an accurate method of estimating water elimination through the skin.
4. A more accurate method of assessing the amount

of retained fluid is to weigh the patient; if the "most part of 50 pints" were retained the patient would have gained about two stones in weight in five days!

5. If this quantity were retained the patient would show œdema of the tissues or heart failure, or both.

The low mortality rate in Mr. Flint's series of cholecystectomies must depend on his operative skill and not on such a preparation for operation. Moreover, such a procedure is obviously inadvisable in a group of people in whom there is a high incidence of myocardial degeneration.

I am, Sir, yours faithfully,

Derby, August 20th. DOUGLAS HUBBLE.

THE WOES OF A HOSPITAL RESIDENT

To the Editor of THE LANCET

SIR,—In view of the present interest in the harmful effects of noise, it is surprising that those responsible pay so little attention to the design of hospitals, for it is doubtful whether any other person is so much exposed to irritations and interruptions as a hospital resident. For some years, in my bed-sitting room, I have been exposed to a cross-fire of the following:—

> Piano, loud-speaker-gramophone, door-bell, ambulance noises, another gramophone, howls from infants' wards, groans from men's ward, chapel organ on Sundays, nurses' rising bell, noises from kitchen and bathroom two yards away, comings and goings of all and sundry. Add to the above the strain of living with several others in crowded quarters and the futility of trying to sleep before midnight.

I doubt whether the usefulness of my reading is augmented thereby; certainly my contributions to medical thought are not as numerous, nor my value to my patients as great as they might be if only I could have quiet.

Oh, for a gas-oven and a shilling's-worth of sleep!

I am, Sir,

A FRENZIED CORRESPONDENT.

A BREACH OF CONFIDENCE

To the Editor of THE LANCET

SIR,—I should be grateful if you would bring to the notice of your readers the following instance of breach of confidence with regard to medical reports for compensation cases, as I feel that a very big principle is involved.

I had examined a man several times for an insurance company from the surgical point of view, and a colleague examined him from the medical side, both of us reporting fully and frankly to the company concerned. When I was recently asked to examine the man, I found to my surprise that he had in his pocket copies of my own and my colleagues reports, and also of the report of a surgeon who had examined the man for his own solicitor. He was thoroughly disgruntled about various remarks made by myself and my colleague, and extremely resentful that it should have been suggested that there was any connexion between the payment of compensation and his disability. Possession of the report of the surgeon who examined him for his own solicitor had had a particularly bad effect on him, and the moderate physical disability from which he suffers was enlarged to cover his whole mental horizon.

I took the matter up with the insurance company for whom I was reporting on his condition and they informed me that they had exchanged medical reports with the man's solicitor and that the solicitor had without their consent or approval handed them over to the man on his insisting on seeing them. The company wrote to the solicitor protesting at this breach of confidence, and apparently he admitted his error and expressed regret. I feel however that this is a glaring instance of breach of professional confidence and that the medical profession generally should be warned to insist that these reports are confidential, and under no circumstances, without the consent of the examining doctor or surgeon, should they be shown to the person examined.

I am, Sir, yours faithfully,

"CONSULTING SURGEON."

THE "GAS WEDGE" IN THE ÆTIOLOGY OF FISTULA IN ANO

To the Editor of THE LANCET

SIR,—In his letter on this subject in your issue of August 18th it surprises me that Dr. Young Kenny has omitted all mention of an obvious aggravating factor in the causation of what might be termed "rectal hypertension." I refer to that form of self-control imposed upon us by the demands of modern polite society. Indeed, Dr. Kenny's letter has revealed for us in a new way the wisdom of that popular saying:

"Where'er you be,
Let your wind go free."

I am, Sir, yours faithfully,

A. L. JACOBS.

University College Hospital, W.C. 1, August 21st.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. R. W. Mussen to be Surg. Comdr.

Surg. Lts. to be Surg. Lt.-Comdrs.: E. J. Mockler, C. H. Birt, and A. J. Burden.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lts. A. E. Williams to *Victory*, for R.N.B., and W. Gough to *Effingham*.

ROYAL ARMY MEDICAL CORPS

ARMY DENTAL CORPS

Lt.-Col. A. B. W. Rust, having attained the age for retirement, is placed on ret. pay.

The undermentioned Capts. to be Majs.: W. A. Cowden and D. A. McGeorge.

TERRITORIAL ARMY

Capt. R. McD. Cairns and Lt. S. G. French resign their commns.

ROYAL AIR FORCE

Dental Branch.—Flying Offr. H. Keggin is promoted to the rank of Flight Lt.

INDIAN MEDICAL SERVICE

Lt. J. M. Davidson relinquishes his prob. appt.

The undermentioned grant of leave has been made by the Commander-in-Chief in India: Maj.-Gen. T. G. F. Paterson, D.S.O., Deputy Director of Medical Services at Northern Command headquarters, on leave until October.

DEATHS IN THE SERVICES

The death is announced from London, Ontario, of Col. Claude Kyd Morgan, who was a distinguished member of the R.A.M.C. After graduating in medicine at Aberdeen in 1893 he entered the Corps in the following year, and shortly afterwards, being promoted captain, distinguished himself for plague duty in Poona. His work was highly commended in a resolution of the Government of Bombay. He did excellent service in the European war, was thrice mentioned in despatches, received the C.M.G. in 1916, and was an officer of the Legion of Honour. He was a member of the British Mission to Washington in 1918, and at the close of the war was appointed C.B. He was a Knight of Grace of the Order of St. John of Jerusalem. Col. Morgan was a Scotsman and was born at Inverkeilor, Montrose, in 1871; he married in 1905 Eleanor, daughter of the late Mr. T. H. Smallman of Ontario. She was created O.B.E. in 1919.

OBITUARY

GEORGES DREYER, C.B.E., F.R.S.

PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF OXFORD

THE death has been announced from Denmark of Prof. Georges Dreyer which occurred at Söllestedgaard, Laaland, on August 17th. The event was due to a sudden heart failure; he was 61 years of age.

PROF. DREYER

[Photograph by Elliott & Fry

Georges Dreyer was the son of Captain G. H. N. Dreyer, an officer in the Danish Royal Navy; his mother was the daughter of a well-known Danish jurist, Judge W. T. Qvistgaard. He was born at Shanghai and having decided, after preliminary education, to enter the medical profession, he graduated in medicine at the University of Copenhagen and embarked upon a long course of post-graduate study. From this there emerged some fine original work, biological and chemical, on, for example, the action of light and the estimation of toxins in all of which he manifested his devotion to quantitative methods and the close application of mathematics. He was undoubtedly influenced by Madsen.

In 1907, having made real mark, he was appointed professor of pathology at Oxford with a fellowship at Lincoln College in accordance with the procedure adopted both at Oxford and Cambridge of electing university professorships to a college society. The compliment thus paid to a young foreigner was a high one, and Dreyer earned his new position by the thoroughness with which he undertook the duties. During the seven years before the war he worked strenuously for the organisation and advancement of his department, while he made contributions,
resulting from original wc quently in
collaboration with Dr. E. W. , on the
therapeutic effects of ligh many
important problems of inflan n, and
immunity. Most of the p ibuted
to the *Journal of Pathology* and
were seen to redound great f the
Oxford school.

At the outbreak of war Dr to
the Pathological Advisory Cc y
Medical Services. He served ur
years with the B.E.F., recei
in the R.A.M.C. and becoming
Royal Air Force. During his
immediately consequent upon
original work which gained him
Stationed at Wimereux he start
the diagnosis of enteric fever.
value of antityphoid inoculation was
by the military authorities, but it
certain quarters, and Dreyer
laboratory work at remarkable

diagnosis and treatment. In 1915, in co
with Dr. Ainley Walker and Dr. A. G. C
recorded in detail the results of observatio
on the patients in the base hospital at
Extreme care was taken to classify all cases
in accordance with the results of detailed
logical examination, particularly as regar
differentiation between *B. typhosus* and *B.*
typhosus, although it was found that prote
could be effected simultaneously against both
using a mixed vaccine. Details of the research we
published in the first instance in our columns e
in 1915. Records were continued in 1918 when
report was published by Prof. Dreyer, associated agai
with Gibson and Walker, with the assistance
Mr. Duncan Gardner, then bacteriologist to th
Standards Laboratory. This record of useful wo
took the form of a report to the Medical Researc
Committee. The consecutiveness of the two doc
ments was marred by the incidents of the war, th
latter communication being originally written i
1916 when the material already completed, with
other valuable data, was lost by fire. The report was held back in the hope that the details of certain of the investigations might be forthcoming later, but this unfortunately did not take place. Though the observations were worked out in a limited manner the authors were able to establish points of great practical importance in support of the production of immunisation by means of typhoid, paratyphoid A, and paratyphoid B. Dreyer determined the detailed form and time relations of the immunity curves for agglutinins following a single or a repeated dose of this triple vaccine; he showed how the time interval between the first and second inoculation influenced the effects. Immunity lasted far longer when the second dose was given at a time when the first had reached its maximum effect; this suggested the advisability of lengthening the interval between them to about three weeks. The standard suspensions prepared in Dreyer's laboratory for this work were issued for general use, making it possible to compare results in terms of agglutinin units and so to follow
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pointed out that when Dreyer applied the measurement for the vital capacity to the assessment of physical fitness he had found the older methods of estimation inadequate, as they were based on assumed relationships between age, height, and weight which could not be substantiated. Dreyer had set out the principles of his researches into vital capacity in tabular form, and with elaborate mathematical calculations had demonstrated the connexions between vital capacity, the weight of the body, the sitting height, and the chest circumference. A clear deduction from this work was, he considered, that the careful study of vital capacity in its proper relation to the body size could give guidance as to the effects to be expected from the sanatorium treatment of pulmonary tuberculosis. In 1920 he published bservations bearing upon the matter in collaboration with Dr. L. S. T. Burrell, who contributed clinical notes of the cases seen in Brompton Hospital, and took the measurements required for application of formulæ, which had emerged from Dreyer's previous investigations into vital capacity. The great variations in vital capacity which must depend upon occupation and modes of life of the individuals being admitted—the athletic and outdoor subject displaying greater capacity than the sedentary one—Dreyer held that these differences in normal persons were not solely related to fundamental bodily deficiency. The careful analysis made by himself and Burrell of the signs revealed by patients of different ages and sexes yielded the practical points that in pulmonary tuberculosis there is a distinct decrease in vital capacity as compared with the normal individual; that an improvement in the clinical condition of the patient under treatment is accompanied by increased vital capacity, while the advance of the disease resulted in a decrease. Thus the vital capacity, the work suggested, could be used as a quantitative measure of benefit received and as an assistance in classification and diagnosis. Dreyer was elected F.R.S. in 1921, served on the Medical Research Council for a period, and was a fellow of the Royal Danish Academy of Letters and Science.

While such are the researches and their results with which Dreyer's name will be most closely associated, he was an endless experimenter and has left behind him incomplete much work, some of it in connexion with his first great subject of interest, the biochemical effect of light rays. But though closely occupied in the duties of his appointment, always interpreted by him in a large fashion, he found time to become an important figure in university life; he was for many years on the Hebdomadal Council, was a curator of the University Chest, and an energetic worker in the affairs of Lincoln College. As teacher and colleague he commanded the high respect and regard of those who worked with him and much well-
d ony to his private and social virtues
public. We are permitted to publish
h reaches us from an assistant in
tory who worked with him for a long

in charge of the department of
ford he was beloved; he was ever
thers with his optimism and his
d a true love of research for its
problems seemed too large or too
is interest. And he approached
an open mind, beginning at their
ntent until by numerous and careful
established a truth that he believed
mathematician he could not tolerate inaccurate work, and his orderly nature required neatness and cleanliness in his laboratory, and he saw that he got them. His work requires no comment from me, but his last published paper on Bovine Tuberculosis, in collaboration with Dr. R. L. Vollum, illustrates the care and the time which he gave to his experiments before he was satisfied with the findings. Georges Dreyer's kindness and thoughtfulness were unfailing; his lovable disposition and large-hearted recognition of the merits of others will live always in the memories of the many to whom he set his great example."—M. C. R.

Prof. Dreyer married in 1900 Margrete, daughter of Laurits Jörgensen, of Söllestedgaard Manor, Laaland, who survives him. He died in her Danish home.

ROBERT ALEXANDER GIBBONS, M.D., F.R.C.S. Edin., F.R.C.P. Lond.

We regret to announce the death of Dr. Gibbons, well known as an obstetrician and gynæcologist although he held no teaching appointment in the London teaching schools, which occurred on Thursday last, August 23rd, at his house in Cadogan-place, London. His interests ranged beyond the technical side of his specialty, for his studies, especially of the causes of sterility in women, led, late in his career, into advanced pathological studies and the deliberation of eugenic questions.

Robert Alexander Gibbons was educated at University College, and completed his medical education at University College Hospital, St. George's Hospital, and the University of Edinburgh. He graduated M.B., C.M. Edin. in 1874 and later proceeded to the M.D., taking also the diploma of F.R.C.S. Edin. At Edinburgh he was house physician and house surgeon at the Royal Infirmary, and was also president of the Royal Edinburgh Medical Society. He took a course at the Rotunda Hospital, Dublin, and held several residential appointments in England, and coming to London was both house surgeon and house physician at Great Ormond-street Children's Hospital.

Gibbons was therefore unusually well-equipped when more than 40 years ago he established himself in general practice in Cadogan-place, London, in the house where he died. He soon became favourably known to a large number of patients; he made practical contributions to medical literature and became a frequent speaker at the Obstetrical Society. He was appointed physician for the diseases of women and children at the St. George's and St. James's Dispensary and at the Royal Pimlico Dispensary, and also physician to the Grosvenor Hospital for Women and Children. Various aspects of his practical experience he recorded in the articles on sterility, dyspareunia, and dysmenorrhœa, contributed to Latham and English's "System of Treatment," and other papers from his pen deserving of mention are articles on the influence of the gonococcus on the female pelvic organs contributed to the *Practitioner*, and on the causation of the onset of labour contributed to the *British Journal of Obstetrics and Gynæcology*.

Some ten years ago various aspects of eugenics, made familiar to him from his professional work, attracted his attention, and he wrote on contraception temperately and with clinical acumen. But his final interest was in an attempt to find out an explanation for the onset of labour. How closely he had thought of the matter, and how intelligently as well as assiduously he had availed himself of assistance where his equipment failed him, may be seen in an article speculating on the rôle of the fœtus in labour, published in THE LANCET last June. Entirely as a result of personal cost and efforts he raised a small fund to be employed by a research worker on this problem and recently investigations were conducted into the question at the Courtauld Institute of Biochemistry. One who was in a position to follow this work writes to us: "It was remarkable to see the way in which Gibbons would follow up the results and his industry in reading the literature which might assist in the investigations. Despite his age and the fact that he did not enter the field of experimental pathology until late in his career he acquired a remarkable grasp of the principles of modern endocrinology as applied to sex hormones."

Gibbons, who was elected F.R.C.P. Lond. and F.C.O.G. was a Knight of Grace of the Order of St. John of Jerusalem. His courteous and handsome presence will be missed at the deliberations of the Council of Epsom College whose meetings he attended regularly.

CECIL W. HUTT, M.D. Camb., M.R.C.P. Lond.

WE regret to announce the death, on August 20th, of Dr. C. W. Hutt, medical officer of health for Holborn, in his fifty-fifth year.

Cecil William Hutt was born in 1880 and was educated at St. Paul's School, going on to Trinity College, Cambridge, with a sizarship. He took first-class honours in his tripos in 1901, and completed his medical education at St. Bartholomew's Hospital, gaining the Brackenbury medical scholarship in medicine and the Matthews Duncan prize in obstetrics. After qualifying in 1905 he held a house appointment at Bart.'s and a series of resident appointments in Manchester and Liverpool before his bent for the preventive side of medicine led him to take the D.P.H. Oxon., and accept the post of assistant M.O.H. at Warrington. From that time his promotion in the public health service was steady: deputy M.O.H. for Brighton, M.O.H. for Dudley, M.O.H. for Richmond (Surrey), and finally in 1922 the chief medical officership of a London borough, which he was holding at th
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Hutt was a ready writer and a frequent contributor to medical journals at home and abroad on public health and social matters. His book on hygiene for health visitors and social workers was one of the best of its kind—lucid in exposition and concise in information—and he collaborated with Sir William Hamer in "A Manual of Hygiene" (1925) which went far beyond its original modest aim of meeting the needs of those seeking to obtain a public health diploma. A more comprehensive work on preventive medicine, edited jointly with Dr. Hyslop Thomson, is in the press. A volume on "International Hygiene" (1927) was the result of congenial holiday visits to continental countries in search of new and fresh methods of dealing with problems which interested him. His instinctive leanings were cosmopolitan and on these tours he would as gladly interview a simple peasant as a distinguished colleague if there was knowledge to be gained. During the past year he had given much time as technical advisory officer to the subcommittee preparing a scheme for dealing with the refuse of London. He was in fact always ready to help with his store of knowledge in the solution of any difficult problem. He gave himself little time for pursuits not in some way connected with his work. He was however always a keen country rambler, and in recent years had taken up sailing with great enjoyment. As a Thameside resident the attraction of the river gripped him, and there he spent much of his summer leisure. He had evidently en working beyond his strength for some months but his death was unexpected outside the circle friends.

Hutt married, in 1909, Jennie, daughter of te Mr. Hesse of Richmond, and leaves a widow ur grown-up children, one of whom is at present at his f r's college at Cambridge, while has rece lified at St. Mary's Hospital.

LAT M. S. PEMBREY

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: "A few details as to may form an interesting ry notice in THE LANCET embrey married Cicely, rake, rector of Jevington, dren, five sons and five happy family life, and all ced in their choice of a profession by their father's scientific outlook, two of them being medical men, one being a veterinary surgeon, the profession for which the youngest is at present studying, while another son is studying agriculture at Oxford. Others have spoken of his work, which was in directions very different from mine, but I can say that as a teacher he was inspiring and had a gift of attracting his pupils and of getting the best out of them by not only being ready to help them but by listening to their views and arguing with them when necessary. A Tory at heart he was a reformer in deed. However forcible he was at times in argument and, indeed, in objurgation, no one who knew him could take offence, first, because the kindly spirit was always obvious, and, secondly, because he generally turned out to be right. His discourse was salted with wise sayings, especially from biblical sources. His favourite quotation, 'All things work together for good,' is characteristic of the man and is to be the epitaph on his tomb."

PANEL AND CONTRACT PRACTICE

The Llanelly Dispute

THE dispute between the doctors serving the Llanelly area and the local workmen's medical committee, in which about 18,000 workers and their dependents are concerned, drags on in spite of meetings arranged to compose the differences under the chairmanship of the mayor. The committee expressed dissatisfaction that the service did not provide certain drugs and preparations, and the doctors were asked either to accept lower fees or to provide the drugs. In support it was pointed out that in 1921, when the rates of payment were agreed, there was an understanding that when wages fell in the district the rates were to be subject to revision. The committee also argued that the work required from the doctors was substantially less owing to the introduction of two specialists for eye, and ear, nose and throat, work paid out of additional contributions, and owing to medical and dental treatment provided for schoolchildren by the local authority. When the workmen's committee gave notice to the 19 doctors concerned of a reduction in payment for medical attendance from 10*d.* to 6*d.* per month for single persons, and from 1*s.* 8*d.* to 1*s.* per month for married persons with dependents, they were met by united resistance to the proposal. Last May the Insurance Acts Committee, sitting as the National Defence Trust, in view of the proposed displacement of insurance practitioners by salaried whole-timers, declared its competence to offer financial support to practitioners who sustained monetary loss in resisting the demands of the workmen's committee; and under the signature of Dr. Robert Forbes, deputy medical secretary, a statement has been issued that the resources of the B.M.A. are to be utilised to maintain the honour of the profession and the well-being of the public.

Local practitioners have now set up a public medical service providing full general practitioner treatment and some consultant service. The rates of this service are the same as existed under the old arrangements, single workmen contributing towards the service in the same degree as before—in spite of the fact that they are entitled to medical benefit under the Insurance Act; but the matter is not quite so simple as might appear, because the workmen's committee controls the local hospitals and has great influence with the local authority. The committee's reply is to start a new medical service with doctors on a whole-time salaried basis. Of the two doctors secured one is believed to have been engaged under a misapprehension, for on discovering the actual state of affairs he resigned. The two specialists engaged by the committee have tendered notices terminating their contracts. Dr. Oscar Williams, secretary to the Llanelly doctors, addressing a public meeting, is reported to have said that 70 per cent. of the workmen have adhered to their doctors. The workers who have thus accepted the public medical service in preference to the committee's scheme propose to form a separate body so that they can be represented in medical matters with delegates from various local works.

The dispute is becoming a serious matter, and unfortunately it cannot be ventilated in the House of Commons until after the recess. In the meantime it should be possible to discover how far the grievances are felt to be serious by the working people themselves. The position of any medical men who take up work for the committee can hardly be other than difficult, and the conditions will be such as to offer little attraction to really good candidates. Disputes of this kind have generally been composed in the past owing to the workmen's committee finding itself unable to obtain competent men to do the work. In the early days of the service they were more frequent owing to the pernicious amendment in the original Act allowing approved "institutions" to use financial payments made to them on behalf of insured persons with no official audit. In the present dispute it should surely be possible for the 18,000 workers and their dependents to see that they are unlikely to get adequate attendance from two or possibly three full-time outsiders when their own 19 doctors did not give them as much as they wanted. Is it not a case in which an inquiry by the Ministry of Health might clear the position?

Births, Marriages, and Deaths

BIRTHS

BRIGG.—On August 22nd, at Chipping Norton, Oxfordshire, the wife of D. A. Brigg, M.B., B.S. Lond., of a daughter.

BUTLER.—On August 14th, at a nursing-home, Cambridge, the wife of Richard Weeden Butler, F.R.C.S., of a son.

RICHARDS.—On August 20th, the wife of F. Alan Richards, B.Chir., M.B. Camb., of a son.

WARNER.—On August 21st, the wife of E. C. Warner, M.D. Lond., of a son.

WIGFIELD.—On August 23rd, the wife of Alan Wigfield, M.B., B.S. Lond., of a daughter.

MARRIAGES

PARR—HERON.—On August 23rd, at Holy Trinity Church, Brompton-road, London, Percy Crowe Parr, M.B., T.C.D., to Dorothy, second daughter of Mr. and Mrs. H. H. Heron, North Finchley.

WINGFIELD—KERR.—On August 15th, at the Parish Church, King's Norton, John Martin Wingfield, M.R.C.S., L.R.C.P., to Madge Durie, younger daughter of Mr. and Mrs. J. Durie Kerr, of King's Norton.

DEATHS

GIBBONS.—On August 23rd, Robert Alexander Gibbons, M.D. Edin., Knight of the Order of St. John of Jerusalem.

HARVEY.—On August 22nd, at Fareham, Hants, Joshua Harold Harvey, O.B.E., M.R.C.S., L.R.C.P. Lond., aged 67.

MACNAMARA.—On August 24th, after a short illness, Eric Danvers Macnamara, M.D., F.R.C.P., of Harley-street, W.

TURNER.—On August 21st, Olive Muriel Turner, M.B., M.S. Lond., the wife of Alfred Charles Turner, of the Bank of England, Liverpool.

WICKHAM.—On August 16th, *at Cobbles, Sutton Scotney,* George William Wickham, L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., L.S.A.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

his equipment failed him, may be seen in an article speculating on the rôle of the fœtus in labour, published in THE LANCET last June. Entirely as a result of personal cost and efforts he raised a small fund to be employed by a research worker on this problem and recently investigations were conducted into the question at the Courtauld Institute of Biochemistry. One who was in a position to follow this work writes to us: "It was remarkable to see the way in which Gibbons would follow up the results and his industry in reading the literature which might assist in the investigations. Despite his age and the fact that he did not enter the field of experimental pathology until late in his career he acquired a remarkable grasp of the principles of modern endocrinology as applied to sex hormones."

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DR. HUTT

[*Photograph by H. J. Whitlock*

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Dr. Hutt married, in 1909, Jennie, daughter of the late Mr. Hesse of Richmond, and leaves a widow and four grown-up children, one of whom is at present studying at his father's college at Cambridge, while another has recently qualified at St. Mary's Hospital.

THE LATE PROF. M. S. PEMBREY

A CORRESPONDENT writes: "A few details as to Pembrey's family history may form an interesting appendix to your good obituary notice in THE LANCET of August 4th. Prof. Pembrey married Cicely, daughter of the Rev. E. E. Crake, rector of Jevington, Sussex, and had ten children, five sons and five daughters. His was a very happy family life, and all five sons have been influenced in their choice of a profession by their father's scientific outlook, two of them being medical men, one being a veterinary surgeon, the profession for which the youngest is at present studying, while another son is studying agriculture at Oxford. Others have spoken of his work, which was in directions very different from mine, but I can say that as a teacher he was inspiring and had a gift of attracting his pupils and of getting the best out of them by not only being ready to help them but by listening to their views and arguing with them when necessary. A Tory at heart he was a reformer in deed. However forcible he was at times in argument and, indeed, in objurgation, no one who knew him could take offence, first, because the kindly spirit was always obvious, and, secondly, because he generally turned out to be right. His discourse was salted with wise sayings, especially from biblical sources. His favourite quotation, 'All things work together for good,' is characteristic of the man and is to be the epitaph on his tomb."

PANEL AND CONTRACT PRACTICE

The Llanelly Dispute

The dispute between the doctors serving the Llanelly area and the local workmen's medical committee, in which about 18,000 workers and their dependents are concerned, drags on in spite of meetings arranged to compose the differences under the chairmanship of the mayor. The committee expressed dissatisfaction that the service did not provide certain drugs and preparations, and the doctors were asked either to accept lower fees or to provide the drugs. In support it was pointed out that in 1921, when the rates of payment were agreed, there was an understanding that when wages fell in the district the rates were to be subject to revision. The committee also argued that the work required from the doctors was substantially less owing to the introduction of two specialists for eye, and ear, nose and throat, work paid out of additional contributions, and owing to medical and dental treatment provided for school-children by the local authority. When the workmen's committee gave notice to the 19 doctors concerned of a reduction in payment for medical attendance from 10*d.* to 6*d.* per month for single persons, and from 1*s.* 8*d.* to 1*s.* per month for married persons with dependents, they were met by united resistance to the proposal. Last May the Insurance Acts Committee, sitting as the National Defence Trust, in view of the proposed displacement of insurance practitioners by salaried whole-timers, declared its competence to offer financial support to practitioners who sustained monetary loss in resisting the demands of the workmen's committee; and under the signature of Dr. Robert Forbes, deputy medical secretary, a statement has been issued that the resources of the B.M.A. are to be utilised to maintain the honour of the profession and the well-being of the public.

Local practitioners have now set up a public medical service providing full general practitioner treatment and some consultant service. The rates of this service are the same as existed under the old arrangements, single workmen contributing towards the service in the same degree as before—in spite of the fact that they are entitled to medical benefit under the Insurance Act; but the matter is not quite so simple as might appear, because the workmen's committee controls the local hospitals and has great influence with the local authority. The committee's reply is to start a new medical service with doctors on a whole-time salaried basis. Of the two doctors secured one is believed to have been engaged under a misapprehension, for on discovering the actual state of affairs he resigned. The two specialists engaged by the committee have tendered notices terminating their contracts. Dr. Oscar Williams, secretary to the Llanelly doctors, addressing a public meeting, is reported to have said that 70 per cent. of the workmen have adhered to their doctors. The workers who have thus accepted the public medical service in preference to the committee's scheme propose to form a separate body so that they can be represented in medical matters with delegates from various local works.

The dispute is becoming a serious matter, and unfortunately it cannot be ventilated in the House of Commons until after the recess. In the meantime it should be possible to discover how far the grievances are felt to be serious by the working people themselves. The position of any medical men who take up work for the committee can hardly be other than difficult, and the conditions will be such as to offer little attraction to really good candidates. Disputes of this kind have generally been composed in the past owing to the workmen's committee finding itself unable to obtain competent men to do the work. In the early days of the service they were more frequent owing to the pernicious amendment in the original Act allowing approved "institutions" to use financial payments made to them on behalf of insured persons with no official audit. In the present dispute it should surely be possible for the 18,000 workers and their dependents to see that they are unlikely to get adequate attendance from two or possibly three full-time outsiders when their own 19 doctors did not give them as much as they wanted. Is it not a case in which an inquiry by the Ministry of Health might clear the position?

Births, Marriages, and Deaths

BIRTHS

BRIGG.—On August 22nd, at Chipping Norton, Oxfordshire, the wife of D. A. Brigg, M.B., B.S. Lond., of a daughter.

BUTLER.—On August 14th, at a nursing-home, Cambridge, the wife of Richard Weeden Butler, F.R.C.S., of a son.

RICHARDS.—On August 20th, the wife of F. Alan Richards, B.Chir., M.B. Camb., of a son.

WARNER.—On August 21st, the wife of E. C. Warner, M.D. Lond., of a son.

WIGFIELD.—On August 23rd, the wife of Alan Wigfield, M.B., B.S. Lond., of a daughter.

MARRIAGES

PARR—HERON.—On August 23rd, at Holy Trinity Church, Brompton-road, London, Percy Crowe Parr, M.B., T.C.D., to Dorothy, second daughter of Mr. and Mrs. H. H. Heron, North Finchley.

WINGFIELD—KERR.—On August 15th, at the Parish Church, King's Norton, John Martin Wingfield, M.R.C.S., L.R.C.P., to Madge Durie, younger daughter of Mr. and Mrs. J. Durie Kerr, of King's Norton.

DEATHS

GIBBONS.—On August 23rd, Robert Alexander Gibbons, M.D. Edin., Knight of the Order of St. John of Jerusalem.

HARVEY.—On August 22nd, at Fareham, Hants, Joshua Harold Harvey, O.B.E., M.R.C.S., L.R.C.P. Lond., aged 67.

MACNAMARA.—On August 24th, after a short illness, Eric Danvers Macnamara, M.D., F.R.C.P., of Harley-street, W.

TURNER.—On August 21st, Olive Muriel Turner, M.B., M.S. Lond., the wife of Alfred Charles Turner, of the Bank of England, Liverpool.

WICKHAM.—On August 16th, at Cobbles, Sutton Scotney, George William Wickham, L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., L.S.A.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

MEDICAL NEWS

University of London

As announced in our last issue Prof. G. Grey Turner has been appointed to the university chair of surgery tenable at the British Post-Graduate Medical School at Hammersmith. The chairs of medicine, obstetrics, and pathology have already been filled by the appointment of Prof. F. R. Fraser, Dr. James Young, and Prof. E. H. Kettle (see THE LANCET, 1934, i., 1423).

Mr. Grey Turner, who is at present professor of surgery in the University of Durham, and senior surgeon to the Royal Infirmary, Newcastle-upon-Tyne, was educated at Newcastle and graduated in medicine in 1898. He took up post-graduate study in London, Paris, and Vienna, became M.S. Durh. in 1901, and F.R.C.S. Eng. in 1903, and was surgical registrar at the Royal Infirmary from 1900 until 1906, when he joined the honorary staff. In these capacities and as university lecturer in surgery he showed great interest in teaching. During the late war he served on the surgical side of 1st Northern General Hospital in Newcastle and with a general hospital in Mesopotamia, where he was acting consulting surgeon at Amara; later he worked as consulting surgeon for chest surgery in the Northern Command, and went on a War Office mission to the United States. He has also visited America on three other occasions; in 1931 he delivered the John B. Murphy oration in Philadelphia, and in 1932 the Bigelow medal was conferred on him after an address in Boston, U.S.A. Likewise he has visited the principal surgical clinics on the continent. In 1927 he succeeded to the chair of surgery at Durham, and two years later he was invited to take charge of a surgical unit at St. Bartholomew's Hospital for a short period, being made a perpetual student of the medical college. At the Royal College of Surgeons of England he is a member of the council and has been Hunterian professor. He has also delivered the annual oration of the *Medical Society of London*, in 1929. *Prof. Grey* Turner is editor of a new edition of "Modern Operative Surgery," which is now in the press, and is a contributor to Choyce's "System of Surgery." He has contributed papers to the medical press dealing with a large variety of surgical subjects, including many on cancer. He is especially interested in the history of surgery.

Society of Apothecaries of London

Sir George Buchanan, C.B., F.R.C.P., has been appointed Master of the Society for 1934–35. Sir William Willcox, K.C.I.E., F.R.C.P., and Dr. J. S. Fairbairn, F.R.C.P., have been reappointed senior and junior wardens respectively.

At recent examinations the following candidates were successful:—

Surgery.—F. A. Frank, Univ. of Liverp.; F. M. Kerry, Univ. of Durham; and J. T. Moohalaparackel, Queen's Univ., Belf.

Medicine.—S. Adams, Charing Cross Hosp.; T. D. R. Aubrey, Univ. of Oxf. and Bristol; M. T. Curran, Univ. of Leeds; A. H. El. S. El Mahallawy, Royal Colleges, Edin.; R. C. H. Ensor, Univ. of Belf. and Guy's Hosp.; F. A. Frank, Univ. of Liverp.; W. H. Jervis, Univ. of Manch.; C. W. O'Donoghue, London Hosp.; J. F. Owen, Univ. of Camb. and St. Mary's Hosp.; H. Paroulakis, Univ. of Innsbruck and St. Mary's Hosp.; and D. Walton, Univ. of Manch.

Forensic Medicine.—F. G. S. Alderson, Univ. of Leeds; F. A. Frank, Univ. of Liverp.; and W. H. Jervis, Univ. of Manch.

Midwifery.—J. A. Amor, St. Mary's Hosp.; N. A. Bicchieri, St. George's Hosp.; D. P. Hickey, Univ. of Manch.; F. M. Kerry, Univ. of Durham; and K. P. Pauli, Univ. of Bristol.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery:—

F. G. S. Alderson, M. T. Curran, J. T. Moohalaparackel, C. W. O'Donoghue, J. F. Owen, and H. Paroulakis.

An Exhibition of Inventions

The tenth international exhibition of inventions, which has been organised by the Institute of Patentees, will take place in the Central Hall, Westminster, London, from Oct. 3rd to 13th. It will be open from 11–10 daily.

Chartered Society of Massage and Medical Gymnastics

The annual congress of this society will be held at Bedford College for Women, Regent's Park, London, N.W., from Sept. 24th to 28th. The first lecture will be delivered by Prof. John Fraser on vascular disturbances of the extremities. The founder's lecture will be given by Sir Humphry Rolleston who will speak on occupational diseases of those in attendance on the sick. The meetings are open to all medical practitioners and further information may be had from the secretary of the society, Tavistock House (North), Tavistock-square, London, W.C.1.

Prof. Bernhard Zondek has accepted an invitation to become director of the obstetrical and gynæcological unit of the Hadassan-Rothschild Hospital in Jerusalem. Dr. Zondek was formerly professor of obstetrics and gynæcology in the University of Berlin, and has made important contributions to the study of sex hormones.

National Smoke Abatement Society

The annual conference of this society will be held at Glasgow from Sept. 27th to 29th under the presidency of Dr. H. A. Des Voeux. The speakers will include Dr. J. R. Currie, Dr. J. S. Owens, and Dr. J. Johnstone Jervis. Particulars may be had from the general secretary at 36, King-street, Manchester 2.

Photographic Documentation in Science

The second congress of the Association pour la Documentation Photographique et Cinématographique dans les Sciences will be devoted to the work of its physical and chemical sections, including surgery. It will take place at the Musée Pedagogique de l'Etat, 29, Rue d'Ulm, Paris, from Oct. 4th–12th. The secretary of the congress is Dr. Claoué, 39, rue Scheffer, Paris XVI.

Medical Officers of Schools Association

A meeting of this association will be held at the Town Hall, Grove-road, Eastbourne, on Saturday, Sept. 15th, at 10 A.M., when Dr. J. Alison Glover and Dr. Fred Griffith will read a paper on acute streptococcal throat infections. The secretary of the association may be addressed at 11, Chandos-street, London, W.1.

Middlesex Hospital Medical School

On Oct. 1st, at 3 P.M., the hundredth winter session of this school will be opened, when Dr. Henry MacCormac delivers an address entitled Our Profession. The prizes gained during the previous year will afterwards be distributed by Sir Farquhar Buzzard. The address and prize-giving will take place in the Queen's Hall, Langham-place. On the same evening the annual dinner will be held at the Savoy Hotel.

Memorial to Dr. Stenhouse Williams

On Oct. 13th Sir Hilton Young, the Minister of Health, will open a library, which has been established at the National Institute for Research in Dairying, at Shinfield, near Reading, as a memorial to Prof. Stenhouse Williams, the late director.

Blindness in Buckinghamshire

The National Institute for the Blind announces that during the past two years there has not been one blind child under 5 years of age in the whole of Buckinghamshire. Out of a total blind population of 310 in the county, exactly 200 are over 50 years of age, and of these 111 are over 70 years of age.

Enlargement of Porth Hospital

A new ward of this Glamorganshire hospital was recently opened by Sir W. J. Thomas and Lady Thomas. The ward, which has cost £7000, is named after the three children of the openers in recognition of the benefactions of the Thomas family to the institution.

Medical Society of London

The programme for the first half of the 162nd session of this society opens with the annual general meeting at 8 P.M. on Monday, Oct. 8th, after which, at 8.30 P.M., Lord Horder will give a presidential address on medicine and morals. Subjects for the Monday evening discussions are as follows: Oct 22nd, the anæmias and their treatment, to be introduced by Dr. Leslie Witts; Nov. 26th, the value of accessory methods in the diagnosis of intracranial tumours and allied conditions (Mr. Hugh Cairns); and Dec. 10th, the future of diagnostic radiology (Dr. H. Graham Hodgson). On Nov. 12th there will be a clinical meeting. The Lettsomian lectures for 1935 will be delivered by Mr. J. E. H. Roberts, and the annual oration by Sir William Willcox.

A Children's Ward at Ilfracombe

The Ilfracombe Tyrrell cottage hospital has been enlarged by the addition, at a cost of £2500, of a children's ward containing ten cots. There are also three wards for paying patients.

Donations and Bequests

Among other bequests, the late Miss Constance Leete-Absolon, of East Sheen, left £2000 to the Royal Hospital, Richmond, part of which is for the endowment of a bed, and £1000 to St. Mary's Children's Hospital, Paddington Green, for a cot to be called the "Leete-Absolon Cot."—The late Mrs. Constance Blyth Watson, of Lindfield, Sussex, widow of Innes Watson, barrister-at-law, left £6000 to Dr. William F. Simpson "in recognition of his great kindness to my late husband during his long illness and to myself during that strenuous and anxious time."

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

Monday, Sept. 3rd, to Saturday, Sept. 8th.—Infants Hospital, Vincent-square, S.W. Course in Infants' Diseases. All-day.—Medical Society of London, 11, Chandos-street, Cavendish-square, W. Lecture-Demonstration by Dr. A. E. Clark-Kennedy on Pleural Pain, at 2.30 P.M., on Tuesday, Sept. 4th.—National Temperance Hospital, Hampstead-road, N.W. Lantern-demonstration on Some Practical Points in the Diagnosis and Treatment of Urological Cases, by Mr. H. P. Winsbury-White, at 3 P.M., on Saturday, Sept. 8th.—Panel of Teachers. Individual clinics in various branches of medicine and surgery are available daily.—Courses of instruction, clinics, &c., arranged by the Fellowship are open only to members and associates.

Appointments

Figdor, Julius, L.D.S., has been appointed Dental Surgeon to the City of London Maternity Hospital

Macdonald, C. R., M.B., F.R.C.S. Edin., Assistant Registrar and Tutor at the Jessop Hospital for Women, Sheffield.

Simmonds, F. A. H., M.B. Camb., D.P.H., Tuberculosis Medical Officer under the Middlesex County Council.

Stewart, Prof. M. J., M.D. Glasg., F.R.C.P. Lond., Hon. Pathologist to the Leeds Public Dispensary and Hospital.

Royal Liverpool Babies' Hospital, Woolton.—The following appointments of honorary physicians are announced:—
Gaisford, W. F., M.D. Lond., M.R.C.P. Lond.: and
Forshall, Isabella, M.B. Lond., F.R.C.S. Edin.

Royal Sussex County Hospital, Brighton.—The following appointments are announced:—
Castleden, L. I. M., M.D. Lond.;
Price, R. Kemball, M.D. Lond.; and
Windle, R. W., M.B. Camb., Honorary Medical Registrars.
Mackenzie, K. F., M.B. Dub., F.R.C.S. Irel.;
Williams, J. C. F. Lloyd, M.B. Camb., F.R.C.S. Eng.; and
Wood, W. R. Forrester, M.B. Camb., F.R.C.S. Eng., Honorary Surgical Registrars.
Drynan, A. E., M.B. Edin., Honorary Clinical Assistant to the Dermatological Department.

Certifying Surgeons under the Factory and Workshop Acts: Scholefield, B. G., M.D., M.Ch. Oxon., F.R.C.S. Eng. (Great Malvern, Hay, Hereford, Ledbury and Leominster Districts); Poole, J. C. C., B.Chir., M.B. Camb. (Crowborough District of the County of Sussex); and Newman, T. B., L.R.C.P.I., and L.M., L.R.C.S.I. (Mullion District of the County of Cornwall).

Vacancies

For further information refer to the advertisement columns

All Saints' Hospital for Genito-Urinary Disease, St. George's-road, S.E.—Res. H.S. At rate of £100.
Birmingham and Midland Eye Hospital.—Res. Surg. O. At rate of £200.
Birmingham Ear and Throat Hospital.—Third H.S. At rate of £150.
Bolingbroke Hospital, Wandsworth Common, S.W.—Res. M.O. £200.
Brighton, Royal Sussex County Hospital.—Cas. H.S. £120.
Brighton Sanatorium and Infectious Disease Hospital.—Jun. Res. M.O. At rate of £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Central London, Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Assts. in Out-Patient Dept.
Cobham, Surrey, Schiff Home of Recovery.—Res. Surg. O. At rate of £200.
Coventry and Warwickshire Hospital.—Res. Cas. O. £125.
Deal, Walmer and District War Memorial Victoria Hospital.—Hon. Physician.
Derby, Derbyshire Royal Infirmary.—Cas. O. and Orthopædic H.S. Also H.S. for General Surgery, &c. Each £150.
Dewsbury and District General Infirmary.—Hon. Orthopædic Visiting Surgeon. Also H.S. £150.
Doncaster Royal Infirmary.—H.S. £175.
Doncaster Royal Infirmary and Dispensary.—Two Hon. Asst. Surgeons.
East Ham Memorial Hospital, Shrewsbury-road, E.—H.S. and Cas. O. At rate of £120.
Egypt, Ministry of Education.—M.O. for Girls' Schools. £E.40.
Exeter, Royal Devon and Exeter Hospital.—H.S., and H.S. to Ear, Nose, and Throat Dept. Each at rate of £150.
Great Yarmouth General Hospital.—H.S. £140.
Harrogate and District General Hospital.—H.P. and Cas. O. Each at rate of £150.
Hove General Hospital.—Res. M.O. At rate of £150.
Hull Royal Infirmary.—Hon. Asst. Physician.
Leamington Spa, Warneford General Hospital.—H.S. for Cas. and Spec. Depts. £150.
Leicester Royal Infirmary.—Two H.S.'s, Cas. O., H.P., and Two Jun. Res. Anæsthetists. Each £125. Also Jun. Cas. O. £100.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Manchester, Abergele Sanatorium.—Second Res. Asst. M.O. £350.
Manchester, Ancoats Hospital.—Res. M.O. At rate of £150. H.P. At rate of £100. Also Med. Reg. £50.
Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.
Manchester Royal Children's Hospital.—Two Asst. M.O.'s for Out-patient Dept. Each at rate of £150.
Manchester, St. Mary's Hospitals.—H.S.'s Each at rate of £50.
Margate and District General Hospital.—Res. M.O. £150.
Market Drayton, Salop, Cheshire Joint Sanatorium.—Res. Asst. M.O. £350.
Middlesbrough, North Riding Infirmary.—Hon. Surgeon.
Miller General Hospital, Greenwich-road, S.E.—H.P. and H.S. Each at rate of £100.
Mothers' Hospital, Salvation Army, Lower Clapton-road, E.—Jun. Res. M.O. At rate of £80.
Northampton General Hospital.—Four Res. M.O.'s. Each £150. Also Sen. Res. M.O. £250.
North Middlesex County Hospital.—Jun. Res. Asst. M.O. At rate of £250.
Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £120.
Preston, Biddulph Grange Orthopædic Hospital.—Jun. H.S. At rate of £150.
Princess Beatrice Hospital, Richmond-road, Earl's Court, S.W.—Res. M.O. At rate of £150. Also H.P. and Cas. O., H.S. and Cas. O. Each at rate of £110.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P. and Cas. O. Each at rate of £125.
Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. O. Each at rate of £100.
Radium Institute, Riding House-street, W.—H.S. At rate of £150.
Richmond, Surrey, Royal Hospital.—Jun. H.S. At rate of £100.
Royal London Ophthalmic Hospital, City-road, E.C.—Sen. Res. O. At rate of £150.
Royal National Orthopædic Hospital, 234, *Great Portland-street, W.*—H.S. At rate of £150.
Royal Northern Hospital, Holloway, N.—H.S. Also Obstetric H.S. Each at rate of £70.
St. Mary's Hospital, W. (Venereal Disease Dept.).—Part-time Asst. Director. £350.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—H.S. £75.
Salford Royal Hospital.—Hon. Asst. S. Also Two H.S.'s., and Cas. H.S. Each at rate of £125.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100.
Scarborough Hospital and Dispensary.—H.S. At rate of £175.
Sheffield Children's Hospital.—H.P. and H.S. Each at rate of £100.
Sheffield, Jessop Hospital for Women.—Res. M.O. At rate of £150.
Sheffield Radium Centre.—Asst. M.O. £300.
Shrewsbury, Royal Salop Infirmary.—Res. H.P. At rate of £160.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Asst. H.P. £125.
Watford and District Peace Memorial Hospital.—H.S. At rate of £150.
West Bromwich and District General Hospital.—H.S., H.P., and Cas. O. Each at rate of £200.
West London Hospital, Hammersmith-road, W.—H.P. Also 2 H.S.'s to Special Depts. Each at rate of £100.
Wrexham and East Denbighshire War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Holt, Norfolk.

Medical Referee under the Workmen's Compensation Act, 1925, for the Aberdeen, Peterhead and Stonehaven Sheriff Court Districts. Applications should be addressed, the Private Secretary, Scottish Office, Whitehall, London, S.W.1, before Sept. 12th.

NOTES, COMMENTS, AND ABSTRACTS

A CHINESE-RUN HOSPITAL

SURG.-COMMANDER J. CUSSEN, R.N., sends us (with permission of the Foreign Office and the Admiralty) an account of the Central Hospital in Nanking which was opened last July on the Chungshan-road overlooking the aerodrome. Most of the hospitals in Yang-tse outposts are under American or British supervision, and the operations are done by foreign surgeons. In this hospital the foreigner would be entirely under the care and treatment of Chinese, there being only one foreign doctor out of a staff of 40. Commander Cussen was shown over the hospital by Dr. J. Heng Liu, the medical director. The framework consists of a central tower, containing the only lift in Nanking, with two long wings each three stories high. The out-patient departments are on the ground floor, classification being much the same as in any London hospital. The first floor contains the beds for poorer patients, who pay 60 cents per diem, the wards being particularly large and airy; "the wall seemed to be all windows," Commander Cussen remarks. Walls and floors are of glazed cement, the beds well spaced, bedsteads painted white, and no sign of spitting on the floor. Above are the first-class patients, who pay 90 cents per diem, which includes medical and nursing attention. There are in all 350 beds, of which 280 were occupied at the time of Commander Cussen's visit. February is recognised as one of the healthiest months of the year in China and the number suggests how well the hospital is patronised even during the slack period. The total cost works out at about 2000 dollars per diem, paid by grant from the central government as the hospital is State-owned. There was, says Commander Cussen, a great air of bustle and slickness about the whole place; it was a weekday on which he inspected the hospital, through all of which he moved quite freely, being much impressed by the orderly routine and daily work of a big organisation. At present the hospital has no medical school, although the nurses, both male and female, are trained there as well as midwives. In the near future it is hoped to have classes and teaching staff for medical students. Most of the electrical fittings and some of the instruments were of German origin, some from America and Vienna; Commander Cussen could find no instrument or object which had been purchased in England. Every appliance likely to help physician or surgeon in his work was there.

The public health department, situated behind the hospital, is a building rather like the hospital in miniature. It might fairly be called the child of Dr. Heng Liu, who is himself vice-minister of public health in the central government. Commander Cussen found there one of the most complete and up-to-date laboratories he had seen. Vaccines are made in the department for protection against cholera, typhoid, and small-pox. There is a room allotted to malaria research, with many types of anopheles in bottles, and charts illustrating the cycle of the disease. Schistosomiasis has a room to itself. The rooms used for preparing health charts and lantern slides in schools interested him especially; models illustrating rashes of scarlet fever, measles, and small-pox were being made. He watched a youth with a plaster cast of a face in one hand and a wire heated over a Bunsen burner in the other, using melted wax to depict small-pox in the vesicular stage—an Epstein at a salary of 80 cents a month. The original models were purchased in Vienna and copies are being made at almost nominal cost. Statistics of tropical diseases are being sent to this department from the country districts, and wall-maps with coloured flags show the prevalence of disease in China. Commander Cussen was impressed by the Stork machine, a ready-reckoner with hand and dial representing months, weeks, and days; by a twist of the handle the expectant mother is told when to date the probable date of labour. Wassermann and Kahn tests are carried out in the laboratory which makes its own antigen for the purpose. Students in the laboratory were preparing mercurochrome in quantity. Throughout there was the appearance of smartness that accompanies recently purchased first-class apparatus, but although, like the hospital, it is still waiting to be proved by time, Commander Cussen was satisfied himself that both had a distinguished future before them.

CANADA AND THE EMPIRE

CANADA has been pleased that Ottawa was selected for the great conference called together with the object of welding the commerical and industrial interests of the Empire, and the *British Trade Review* for July, 1934, in a large and fully illustrated issue, does justice to the industry and perseverance of the country. The letterpress has been supplied by representative and often very important writers, and the general position of the commercial relations between this country and Canada is excellently set out. The exhibition of Canadian products recently held in St. Paul's Churchyard, E.C., was a proof of material progress, and on many of the stalls were to be seen domestic appliances, articles of clothing, and foodstuffs with direct interest to doctors and others in charge of health agencies or health-promoting industries. Canada is now Britain's chief supplier of some of these articles, and the Exhibition proved that coöperative methods within the Empire are on the increase in a practical and valuable manner.

TUBERCULOSIS AT BREST

SOME three years ago we quoted [1] from a paper on tuberculosis at Brest, which ended on a note of confidence that there was to be less in future. But there has since appeared in the same journal another paper,[2] by J. Querangel des Essarts, not quite so encouraging. The situation is undoubtedly remarkable. Whereas the general death-rate of the French navy from tuberculosis is 5·3 per 1000, it is 9·6 in the Brest division. Likewise in the garrison of Brest it is 8·5, or double the general rate of the French army; in the dockyard it is 10·5, and in the town 5·28 (7·9 in the worst districts). The town has 70,000 inhabitants, and is somewhat isolated in its position at the extreme end of the Department Finistère, its main industry being the navy and the dockyard. Some people think Bretons specially liable to consumption, but they give no indication of this susceptibility when they are settled in French colonies abroad. The trouble at Brest is that there is great overcrowding and the families are large. Among the families of invalids visited by des Essarts, of those numbering from 5 to 12 persons, half were living in one room. The surroundings ashore are thought more dangerous than in ships, and it is proposed to reduce the liability to tuberculosis by improving conditions of life, by giving help to invalids to get treatment, by segregating them from their families (who will then themselves need assistance), and by B C G inoculation for their children.

ACCIDENTS IN PNEUMOTHORAX TREATMENT

Dr. E. Frommel and Dr. M. Demole have endeavoured to calculate the frequency of accidents during the induction of a pneumothorax or a subsequent refill (Rev. de la Tuberc., 1934, No. 1). In order to secure adequate data they addressed a questionnaire to the leading chest specialists and sanatoriums in Switzerland, and obtained information about more than a quarter of a million injections. Among these there were 63 accidents—0·28 per 1000—of which only 5 were fatal. About a quarter occurred at the first injection, the remaining three-quarters being associated with a refill; but as, on the average, the patient has some 50 refills in the course of four to five years' treatment and only one first injection, the comparative danger

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[1] THE LANCET, 1931, i., 1412.

[2] Arch. de Méd. Navales, 1933, cxxiii., 601.

ADDRESSES AND ORIGINAL ARTICLES

CONCOMITANT SQUINT AND ITS TREATMENT *

BY L. H. SAVIN, M.D., M.R.C.P. Lond., F.R.C.S. Eng.

ASSISTANT SURGEON TO THE ROYAL EYE HOSPITAL; JUNIOR OPHTHALMIC SURGEON TO KING'S COLLEGE HOSPITAL; OPHTHALMIC SURGEON TO THE METROPOLITAN AND WHIPPS CROSS HOSPITALS

THE disadvantages of a squint need little emphasis. At school a squinting child is very apt to suffer from his fellows' youthful dislike of the abnormal; his friends call him "boss-eye," and his enemies exercise a somewhat crude sense of humour at his expense.

Hence the psychological implications of a squint are always worth consideration; but the chief object of treating it is neither the psychological nor the cosmetic one, but the prevention of amblyopia in the squinting eye.

The ætiology of concomitant strabismus is still not altogether understood. Hippocrates[1] recognised a distinction between paralytic and concomitant squint. The latter he thought due to epilepsy, or in some cases to heredity. A parent with a cross-eye often had a cross-eyed child. In 1738 we hear of an operative cure for squint by the Chevalier Taylor, a flamboyant but intelligent quack oculist whose adventures were well described by Coats.[2] The details of the operation were surrounded by deliberate mystification; but the evidence appears to point to Taylor having discovered the secret of tenotomy of the internal rectus. It is difficult to decide how far he was scientist and how far charlatan. The secret discovered by this Englishman was forgotten. It is not till the next century, in 1839, that we have the first authenticated tenotomy of the internal rectus on the living subject by Dieffenbach.[3] Anthony White and Stromeyer[4] had both previously suggested the operation.

At this period the muscular theory of squint held the field. It was thought that strabismus was due to shortening of one of the ocular muscles. In fact such shortening is quite frequently found in a case of long-established squint limiting the movements of the eye in one direction. We now know that such changes are secondary, and are not the primary cause of the condition. Most squints are dynamic and will pass off under an anæsthetic.

In 1864 the great Donders[5] pointed out the association of hypermetropia with many cases of squint. Uncorrected hypermetropia requires the exercise of a constant effort of accommodation; and he observed that normally accommodation is associated with convergence. He suggested that this was the cause of squint, the eye of greater refractive error converging more and turning in. This association of accommodation and convergence is well demonstrated in the following cases.

A girl, aged 12, was said to suffer from transient attacks of partial blindness. On examination her vision was found to be about 6/36 in each eye. I noticed that the eyes now and again converged in a spasmodic fashion. With a −1·75 sphere before each eye she saw 6/6 easily. When the refraction was worked out under a cycloplegic she was found to be emmetropic. This spasm of convergence and of accommodation appeared to be of reflex origin; it cleared up after treatment of a conjunctivitis from which she suffered. Some such cases appear to be hysterical. A youth of 18 years had a narrow escape in a car accident and then complained of diminished vision. On examination both eyes were turned in and in a spasm of accommodation. Under a cycloplegic the convergence was at once materially reduced and soon cleared up.

Donders's theory was of enormous practical value, as it led to the careful correction of refractive errors in squint, under which treatment many cases clear up. Obviously, this theory cannot explain such cases of squint as those in which the refractive error is negligible or in which an eye with poor vision starts to squint, as in the squints so commonly found in cases of central corneal nebulæ in one eye. Obviously, also, there must be some other factor involved, or all cases of high hypermetropia would squint. In Donders's writings one finds the germ of an explanation. He wisely remarks: "The desire to see an object singly with both eyes, at the same moment, makes itself, as a general rule, energetically felt." In this country Claud Worth[6] particularly has stressed the important part played by the "fusion sense" in the causation of squint. Binocular vision he classifies in three grades:—

1. Simultaneous macular perception.
2. True fusion with some amplitude.
3. Sense of perspective.

To this grouping one may perhaps be allowed to add a fourth grade or subgroup—"Highly developed sense of perspective." Anybody who works with a stereoscope finds it more difficult to get a sense of perspective with some pairs of pictures than with others. Some patients who can get simple perspective effects on such a stereoscope as the Worth's amblyoscope, for instance, fail entirely to get the perspective effect with more complicated pictures.

If a series of squint cases is examined it will be found that all have defects in binocular vision. Worth considers defect of the fusion sense the primary factor in the production of squint. A case with high astigmatism in one eye only or with a corneal nebula will obviously have defective fusion and so will be more likely to squint.

Defective fusion sense is not the only factor involved. I recently worked out the degree of binocular vision in 12 medical students all of whom had good visual acuity. Only 7 had perfect binocular vision; 3 achieved plane fusion; 2 had only simultaneous macular perception. None of these students squinted. Many people in ordinary life get on quite happily on plane fusion. A car can readily be driven in the country on second grade binocular vision, though stereoscopic vision is of great help in town driving.

The ordinary person has a master eye on which he mainly depends, usually the right eye. The second eye fills in a few details not visible to the master eye. The truth of this is readily apparent if one tries to use the other eye for shooting.

For the development of a squint some other factor is usually necessary besides defective fusion sense. It may be a neuromuscular incoördination—e.g., following measles, pertussis, or other specific fevers. In some cases, the convergence-accommodation coördination is rendered more difficult by hypermetropia, as Donders described. In high myopia there is little accommodation for close work; the eyes fail to converge; diplopia results and the image of the worse eye is suppressed. The fusion sense becomes more defective and the myopic eye tends to diverge, producing a divergent concomitant strabismus.

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* A post-graduate lecture delivered at King's College Hospital.

Sometimes the factor predisposing to squint is of such a nature as to suggest some abnormality of genes or chromosomes. Among my strabismus cases are two little girls, identical twins. They are almost indistinguishable now that I have operated on their squints. Features and temperaments are alike; both have rough, dry skins; both have epileptic fits; one is slightly more shy and less round-faced than the other. Their squints were like mirror images; one squinted in the right eye, the other in the left. The refractions were similar, but right and left sides were reversed. Ormond [7] reported a series of mongolian idiots in which 21·4 per cent. had squints. I cannot but suspect that the factors which caused their epicanthic folds, ridged tongues, crooked little fingers, adducted great toes, and mental retardation might possibly be concerned with their squints. In the language of modern genetics, some idiokinetic influence has acted on the chromosomes and their genes; not a very different conception from that of Shakespeare in *King Lear* (Act III., sc. 4):—

> "This is the foul fiend Flibbertigibbet: . . . he gives the web and the pin, squints the eye, and makes the hare-lip."

SUPPRESSION OF VISION

Once a squint has set in, the natural result will be diplopia, as indeed is often seen in paralytic strabismus and heterophorias in adults. The child gets over this difficulty by suppressing the vision in the squinting eye, the eye becoming amblyopic—the so-called amblyopia ex anopsia (weak vision from disuse). This term hardly gives a true conception of what occurs. The process is more in the nature of an active inhibition of vision. One is apt to think of suppression of vision solely as a pathological phenomenon in squint. Actually we tend to suppress or suspend the vision of one eye every time we look down a microscope. I had the curiosity to investigate the power of suppression in a number of normal people. They varied from complete inability to suppress to the power to suppress the vision of one eye at will. I have had much experience in helping medical students to use the ophthalmoscope. Most students can acquire the power of suppression in one eye; but there seem always in each group to be one or two men who have the greatest difficulty and very likely have persistently to close the eye which they are not using for the instrument. At the other extreme are people who suppress with extreme readiness—e.g., hysterical monocular blindness. The amblyopia of the hysteric presents considerable resemblance to that found in squint. It does not seem to be of conscious origin; I have often been thanked with what seems complete sincerity by an hysteric whose blindness has been relieved. Hysterical amblyopia, like amblyopia in squint, may be of long duration.

Ten years after the war I saw a man who lost all but perception of light in his right eye during some frontier fighting in India. The story was that he lost his memory for some hours and then found himself some miles behind the front line. His condition was diagnosed as sunstroke, and he found he could not see with the right eye "owing to a blood-vessel bursting behind it." This disability meant that he could not fire a rifle, and he was transferred to a job at the base. The disability persisted into civilian life. Seen in 1928 for refraction he was unable to count fingers with the eye, which presented no objective signs of disease. He was told there was a chance of late recovery after sunstroke, and after a few lessons on the amblyoscope his vision improved to 6/12. This case responded to tests in the same way as an amblyopia from squint, except that there was constriction of the visual field. The cure was due to removal of a strong inhibition to vision in the right eye.

All the evidence goes to show that the amblyopia of squint is due to inhibition of vision, not disuse. I have operated on a child of 12, practically blind from birth from cataract following corneal perforation in ophthalmia neonatorum. The resulting vision, allowing for corneal nebulæ, was good. If simple disuse could cause amblyopia, surely he would have had it.

The cerebral mechanism of suppression is rather interesting. If the inhibition involved one calcarine cortex, inhibition of half the visual field would be expected. Actually the amblyopia involves cone vision in the whole of one eye except for a small piece of temporal field not overlapped by the field of the straight eye. This is an extraordinarily circumscribed area to be selected for inhibition. In hysterics visual inhibition seems closely associated with an emotional factor. The large majority of squinters seem to be of averagely placid temperament. Whatever the mechanism of suppression, it is a process capable in certain cases of rapid removal.

ALTERNATING CONCOMITANT STRABISMUS

Like migraine, alternating concomitant strabismus is a disease of the mentally intelligent. The patients are active and alert, keenly interested in their surroundings, and are up to all sorts of dodges, such as learning by heart the Snellen's test types and the amblyoscope pictures. At will the patient can see with either eye, while he squints and suppresses with the other. The milder cases blink their eyes in a typical way when changing from one eye to the other. Worth distinguishes between the essential alternators with no binocular vision and the facultative alternators who usually prefer to use one eye but can in emergency use either. Alternators often show signs of incoördination between the two sides of the body. A smile will often start on one side of such a child's face followed at a fractional interval by the spread of the smile to the other side. The rare instances where squint may have an emotional basis are to be found in alternating squinters. One little girl voluntarily straightened her eyes up on the operating table and tearfully promised she would always keep them straight in future. She now alternates (according to her mother) when by herself at home, but straightens up when she meets the formidable bogy of the surgeon at hospital. Of course these dynamic squints may later become organic from actual secondary shortening of the internal recti.

FALSE PROJECTION

If the good eye in a case of squint of long standing is covered and the patient asked to point out the direction of objects, he will make a much better job of it than the observer would expect from the degree of squint. It seems that the brain has realised that the eye is not straight and is making allowances. If the eye is put straight this false projection usually ceases, but not always—as shown by the following case.

A lady, aged 24 years, had since childhood a right convergent concomitant squint of 55 degrees (40 degrees with glasses). Although the right eye usually squinted she could with an effort alternate the squinting eye. An operation was performed which left the eye straight with glasses. In a recent letter from Australia she wrote: "As regards straightness I am glad to be able to say my eye seems to be keeping quite alright. I find myself using the left eye a great deal more than the right. It appears to me that, although my eye itself is straight, the angle at which it had been accustomed to looking when it was squinting is hard to change. If I make an effort to use my right eye when it is straight it seems to be looking to the outer side. Ought I to persevere till I can use the right eye as well as the left ? "

In what part of the brain do these complex cerebral readjustments take place ? Direct evidence is scanty. Holmes and Horrax in 1919 [8] reported a case showing, among other signs, loss of stereoscopic vision following a gunshot wound which seemed, by craniometry and other tests, to involve both angular gyri. Riddoch in 1917 [9] reported a case where stereoscopic vision was lost after a bullet wound which " may or may not have injured the left optic radiation fibres, but certainly passed through those of the right hemisphere." In both cases the lesions were crude and severe.

We may, perhaps, by analogy gain some insight into the nature of suppression by considering the conceptions of Pavlov [10] concerning inhibition. He applies the technical term of " analyser " to the entire mechanism of those parts of the central and peripheral nervous system which are related to each particular receptor organ—e.g., retina, optic nerve, tracts, radiations, and cortex. Inhibition is " local sleep," and the seat of inhibition is within the inhibited analyser and not within the inhibiting one. Little is known of the anatomical localisation of such " local sleep " as the suppression of vision in a squinting eye. Ordinary sleep is a process of widespread inhibition of cortical and subcortical centres. Righetti[11] working on tumours and von Economo [12] on encephalitis have shown that in states of pathological sleep lesions are found in a high percentage of cases in relation to the third ventricle. This association must be of significance.

TREATMENT OF SQUINT

In the treatment of this condition we should have in mind from the start the results for which we are aiming. In a cured case we should find :—

1. The eyes straight.
2. Good visual acuity in each eye when refractive errors are corrected.
3. Full binocular vision.

When a case is seen for the first time the physician should :—

(a) Take a careful history, including a family history of any squint. A knowledge of the social conditions of the family is of importance. Attendance twice a week for orthoptic treatment should not be ordered if it means a struggling parent losing two half-days' work to bring the child.

(b) The visual acuity is accurately measured if possible. Children too young to read letters can use one of the test-type boards with animal pictures of graded sizes. During this procedure the surgeon gains the child's confidence and does his best to break down the rooted idea that a doctor is a bogyman who prises one's mouth open and jams a spoon down one's throat. If vision is poor the squinting eye is tested for central fixation.

(c) By this time the child will usually consent to look down one of the varieties of amblyoscope. A graded series of pictures will soon settle the degree of binocular vision present, if any.

(d) Accurate measurement is made of the degree of squint. The Maddox tangent scale and the Priestley Smith measuring tape are both good for purposes of measurement. Allowance should be made for the angle " gamma," or the angle between the optic axis—or line on which the refracting surfaces of the eye should be centred—and the fixation axis. The latter is a line drawn from the object viewed to the hypothetical centre of rotation of the eye. This conception has recently been disproved by van der Hoeve.[13] In practice the angle " kappa " between the central pupillary line and visual axis is more conveniently measured by clinical methods.

(e) The refraction of the eyes should next be measured under full atropine cycloplegia. Glasses are ordered of such a strength as to give the maximum visual acuity when the atropine has worn off. In all except the most stupid children it is a mistake to over-correct the hypermetropia in the hope of reducing accommodation and convergence for near objects. The patients soon find they can see better without the glasses, and look round them or take them off. Worth, in a series of cases, actually found the deviation was greater when they were over-corrected.

(f) After the glasses have been worn for a month the patients should be re-examined, the squint, if present, accurately remeasured, and the visual acuity in each eye re-determined. In about 33 per cent. of cases the eyes will be straight. If the squint recurs when the glasses are removed, or if the visual acuity is lowered in the squinting eye as compared with the sound eye, further measures are advisable.

(g) If the squint is under 10 degrees in amplitude and the vision in the worse eye is 6/12 or better, fusion training may be tried. It is no good before operation if the squint is of the alternating type. The idea is to train the fusion sense on one or more of the specially adapted stereoscopes known as amblyoscopes. Various firms of opticians have of recent years produced many types of giant amblyoscope specially adapted for use in large-scale orthoptic clinics. They are more imposing-looking machines and will stand heavier wear than their progenitor, the Worth amblyoscope, but the latter will produce equally good results. The patient is exercised once or twice a week, or more often if possible, on graded series of pictures so arranged as to require an increasing degree of binocular vision. Satisfactory perspective pictures must all be capable of being reversed. It is no use making the patient say which of two objects is the nearer if it is perfectly obvious from the shading of the picture. Children often have good memories and will remember from the previous visit which object is in front unless they can all be reversed at will. The Griffith set of amblyoscope pictures fulfils all these difficult conditions.

If one picture in the amblyoscope is imperfectly seen it can be brought to the child's attention by increasing the illumination on that side—e.g., by an electric torch. The child should be encouraged to persevere with what seems like a hard school task, if necessary by bribery, as by drawing pictures for him.

It is interesting to watch how the binocular vision improves. A child may stop at the same grade for several visits, then there is a sudden jump of one or two grades. To my mind this is a strong argument in favour of the idea that the low-grade binocular vision is due to active inhibition of the vision of the squinting eye. Amblyopia is not really from disuse. Hysterical amblyopias also improve on the amblyoscope by sudden leaps from one grade to a higher.

If full-grade binocular vision can be obtained, the squinting eye will come straight at once. It must never be assumed that a patient has really regained stereoscopic vision unless a whole series of pictures is correctly interpreted in succession. One or two pictures may be correctly guessed by any child. Many published results are vitiated by lack of care in avoiding this error. I have often listened to enthusiasts unwittingly suggesting to their patients the replies they ought to give.

When the patient has acquired binocular vision this must be nurtured like a delicate plant. I have seen many cases—believed to be cured or improved—relapse after an untreated interval or an attack of some minor malady. Instruments such as the Maddox "cheiroscope" and the Whittington stereoscope use the principle of coördinating hand and eye and are often of value.

Orthoptic treatment, therefore, is difficult and uncertain. It is no good unless the patient can attend at short intervals over a long period; it is little use in squints of large amplitude or in the presence of amblyopia of any degree. Many cases expected to be favourable do not respond, or relapse. There is, however, some scope for the treatment, which is especially useful when used intensively after a squint has been almost straightened by operation.

OCCLUSION OF THE GOOD EYE

(*h*) If, after the trial month, the squinting eye shows a squint or some amblyopia this is worth trying. It was originally suggested by the naturalist, Buffon, about 1743.[14] In small children, the good eye may be kept shut by a pad and adhesive plaster, as recommended by Worth. In older children, the best way is to get the mother to sew a black patch over the glass before the non-squinting eye. The patch should cover the chink near the nose and should be extended along the limb of the glasses on that side, otherwise the child tends to look round it. There are many manufactured occluders on the market, perhaps the best being Doyne's. In my experience the mother is rather apt to assume that a bought occluder must necessarily be efficient. On the contrary, she is constantly watching to see if the child is looking round the home-made one, and it therefore gives better results.

Occlusion, to be effective, must be continuous. It should be continued until the vision is improved to its maximum possible degree. This may take several months. Over the age of eight years the chances of improvement from occlusion are reduced, but are not so remote as the text-books suggest. I have seen a boy of 16 improve from amblyopia to 6/12 after occlusion.

A similar method, particularly useful in infants, is the instillation of atropine drops into the good eye. In babies the squinting eye quickly acquires amblyopia if left alone, but if the other eye is atropinised the squinting eye is forced into use for close vision.

Glasses can be worn with benefit by infants of nine months and over, but atropine can be used in the good eye whenever a squint is noticed. Delay may cause amblyopia and a squint, irremediable except by operation.

SURGICAL MEASURES

(*i*) If all the methods previously mentioned have been given adequate trial and have failed, as they often do fail, then operation should be performed, provided the child is in good health and free from septic foci. Under modern conditions and with modern needles and instruments, operations for squint can be undertaken at any age over three years with the fair certainty of obtaining at any rate a good cosmetic result. The reluctance shown by some surgeons to operate before puberty is a relic of the reaction which set in against the indiscriminate tenotomies of the end of last century. These tenotomies were uncontrolled surgical procedures and, as Worth recalls, were often followed by secondary divergence of the eye in the opposite direction. In modern squint operations, muscles are advanced or retired over measured distances and fixed by suture to the sclera. It is more and more realised that the sclera, though under a millimetre thick, is so tough that it affords firm hold for sutures if the needles used are sharp and inserted tangentially.

In a concomitant convergent strabismus of small degree it is good practice to advance the external rectus muscle on that side. For squints of larger amplitude retirement of the insertion of the internal rectus is effective. The insertion of the muscle should not be put back behind the equator of the eye, or the muscle will act at serious mechanical disadvantage and there may be danger of a late divergence. The exact distance to which the new insertion is displaced is regulated by experience; there is no rule-of-thumb method of calculation. Details of technique vary extensively.

A successful operation from the cosmetic point of view should not mean the end of treatment. If the eyes are straight, measures such as occlusion of the good eye for amblyopia, and fusion sense training, are much more likely to succeed. The criteria of a cure must not be forgotten: straight eyes, good sight in each, full binocular vision. Once the first factor is achieved the others are more likely to follow. Not long ago I tested the binocular vision of three cases of squint operated on two years before. Owing to circumstances, no training of the fusion sense had been tried before or after operation. They had all acquired full binocular vision by the unaided exercise of their own eyes. I thought wistfully of how well they would have looked in my somewhat meagre statistics of successes under orthoptic treatment.

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DISTURBANCES OF THE BODY TEMPERATURE *

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WE have already seen that the various processes which are concerned in the genesis and dissipation of heat are under nervous control, but there is great diversity of opinion as to whether special centres for the regulation of the body heat exist in the brain.

Heat-regulating Centres in the Brain

Sir William Hale-White, to whom I am deeply indebted in the preparation of these lectures, by experimental observations upon animals and by clinical investigation was led to the conclusion that one or more special centres for controlling the mechanism of heat regulation existed. He showed that injury to the brain of an animal in the neighbourhood of the corpus striatum was followed by disturbances of the body temperature most often in the direction of an increase. Further indication that the heat-regulating centre was situated in the neighbourhood of the basal ganglia was suggested by experiments in which the brain was destroyed in front of and behind this region respectively. Destruction behind this part of the brain is followed by an entire upset in the heat-regulating mechanism; whereas in front of the basal ganglia the cerebrum of a dog can be removed without any marked change in temperature regulation. In such a case normal temperature regulation is preserved but is limited in range. The animal responds appropriately to external heat and cold, though its temperature falls if it be left for a long time in a cold room.

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* The second Lettsomian lecture for 1934, delivered before the Medical Society of London on Feb. 28th. Lecture I. appeared in our last issue and Lecture III. will be published in due course.

Some years ago H. G. Barbour carried out a series of interesting experiments in which heat and cold were applied locally to the corpus striatum. When a tube containing hot water was introduced into the corpus striatum the blood-vessels of the skin dilated, there was increased secretion of sweat, and the rectal temperature fell. When cold was applied muscular metabolism was increased and contraction of the vessels of the skin ensued with the result that the body temperature rose. In eliciting these reactions water had to be employed several degrees above and below that of the body temperature. If the corpus striatum was really a delicate thermostat as has been suggested one would have expected that it would have been extremely sensitive to minute differences of temperature.

Since this time further attempts have been made to localise more accurately the site of the heat-controlling centre, and recent investigations suggest that it is situated in the hypothalamic region and most probably in the tuber cinereum. Careful removal of the corpus striatum has produced no loss of temperature regulation (Samson Wright: "Applied Physiology," 1931, p. 87). Puncture of the tuber cinereum has given rise to a sudden increase in the respiratory rate and often extreme pyrexia—occasionally 109° F.—has been recorded. In many instances glycosuria has occurred, polyuria setting in very regularly within one to three days from the time the puncture was performed. From the fact that Barbour had to employ water several degrees above or below that of the body, it has been argued that the site concerned with heat regulation must be situated some distance away from the corpus striatum where the tubes were applied and in the light of what has just been said this site might well be the tuber cinereum. I doubt in the present state of our knowledge if more can be said. Cramer, whose views on the causation of pyrexia we shall notice more fully presently, regards heat regulation as a function of the sympathetic nervous system controlled by the thyroid-adrenal apparatus, and points out that the so-called heat centre in the tuber cinereum is explicable as a group of nerve-cells representing the central connexions of the sympathetic system.

PYREXIA ASSOCIATED WITH CEREBRAL HÆMORRHAGE OR TUMOURS

It has long been known that hæmorrhage into the pons, or cerebral softening in this position, is usually accompanied by pyrexia. It was Hale-White who furthermore drew attention to the fact that damage to the motor cortex of the brain is likely to be attended by a rise of temperature. He pointed out that in cases of hæmorrhage from the middle meningeal artery, blood clot may press upon the cortex and cause pyrexia which in some instances may reach 109° F. He says:

> "There is hardly any part of the brain a lesion of which has not at some time or another caused a rise of temperature. Seeing, however, that disease of the cord, of the pons, of one crus, of the basal ganglia and of the motor area of the cortex will all cause pyrexia, it is highly probable that in man the course of at least some of the nervous impulses which control the temperature is the same as, or much the same as that of motor impulses. It is true that disease of other parts of the brain will cause pyrexia—thus we have known hyperpyrexia to be due to a cerebellar tumour but . . . parts far removed from the lesion may be exposed to pressure or suffer from interference with their blood-supply. In the case of the cerebellar tumour just mentioned in which the temperature reached 107·4° F. the corpora quadrigemina and surrounding parts were much compressed by the tumour."

The pyrexia consequent upon aseptic damage to the brain both in man and in experiments on animals is usually short in duration and difficult to control, prolonged immersion in cold water being necessary to effect a reduction. A study of the temperature chart in a case of apoplexy is of interest. In an ordinary case of cerebral hæmorrhage where rupture of one of the branches of the middle cerebral artery which pass through the anterior perforated space occurs there is an initial fall of temperature lasting a few hours and attributable to shock, the temperature then rises 2–3° above the normal, the highest point being generally reached in 24 hours. In a case that is going to terminate favourably the temperature then slowly falls, the normal line being reached within a few days. This is usually followed for two or three days by a subnormal reading and then the normal standard is again reached. Not every hæmorrhage in this situation is attended by pyrexia; in some instances the damage is too slight, in others the hæmorrhage is so profuse and the shock so profound that no pyrexial response supervenes. If the temperature be taken in the axilla of the paralysed side in an ordinary case of cerebral hæmorrhage it is likely to be higher than in the axilla of the unaffected side and may remain so for several days, the difference gradually becoming less. At first the difference may be as much as 1° F. Hale-White attempted to discover the cause of this by recording the surface temperature, estimating at the same time the amount of sweat secreted on each arm. He says:

> "It is clear that the arm with the higher surface-temperature or secreting the greater amount of sweat will be losing heat the faster of the two arms. By this method it was found that the loss of heat was greater from the arm of the paralysed side, that is to say, the side on which the axillary temperature was higher. But the axillary temperature is an internal temperature, and the loss of heat is therefore greater on the side on which the internal temperature is higher. This being so more heat must be produced in paralysed than in the healthy muscles. These observations if confirmed suggest that as the muscles are the chief thermogenetic tissues, a lesion which paralyses their motor function exalts their thermogenetic activity" (Allbutt and Rolleston: "A System of Medicine," 1905, vol. i., p. 849).

The statement that more heat must be produced in paralysed than in healthy muscles appears to be at variance with the conception that metabolic activity is the source of heat production. An explanation more consonant with the principle of metabolic activity would, I think, be more convincing, and I think it is to be found.

In a paralysed limb the arterioles at first are dilated on account of loss of vasomotor tone and the early rise of temperature on the paralysed side is to be attributed to the greater amount of blood flowing through the dilated arterioles. Tone in smooth muscle is not so completely dependent on reflex nervous impulses as is the case in voluntary muscle. A certain power of adaptation which is independent of the nervous system appears to be present and asserts itself after a few days (compare the case of a paralysed bladder). In consequence of this less blood circulates through the paralysed limb and, owing to the paralysis of the skeletal muscles, the venous return is impaired. Blood tends to stagnate and, in consequence, the temperature falls till eventually the paralysed limb becomes colder than the unaffected one.

In cases in which the pons or medulla are damaged either a rise or fall of body temperature may ensue. It is usually said that a pontine hæmorrhage causes hyperpyrexia. This, however, is not always so. The greater part of the body is not only paralysed but is cut off from the control of the heat-regulating mechanism. The patient is comparable therefore to a poikilothermic or cold-blooded animal, the temperature following passively the temperature of the environment. Where the person is well covered and surrounded by hot-water bottles the temperature of the paralysed parts of the body will rise. If the paralysed parts are cooled the general temperature will fall. In hospital the former conditions usually prevail and a high temperature therefore is more commonly to be observed. No sensory impulses can pass from the paralysed parts to the brain, nor can efferent impulses reach the affected muscles or the blood-vessels.

Tumours arising in the neighbourhood of the third ventricle by causing downward pressure upon the tuber cinereum and the pituitary body may give rise to irregular pyrexia accompanied by somnolence, polyuria, hyperglycæmia, and glycosuria. In such cases the sufferer may furthermore grow obese and show sexual regression. Neoplastic metastases in this situation may give rise to progressive cranial nerve palsies, drowsiness, cervical rigidity, and pyrexia producing a clinical picture not easy to distinguish from tuberculous meningitis. In a case of paraplegia resulting from a complete transverse lesion of the spinal cord, the man when he feels cold shivers only with the muscles supplied by nerves above the lesion; on the other hand, when he is hot he sweats only down to the line between the sensitive and insensitive portions of his skin. Such observations are of use in investigating the position and severity of a spinal lesion.

Part Played by the Ductless Glands

No one interested in the subject of regulation of the body temperature can afford to neglect the views put forward so succinctly by W. Cramer in the book entitled "Fever, Heat Regulation, Climate, and the Thyroid-Adrenal Apparatus," published in 1928. I do not think I can do better than to state in his own words the conclusions he reaches.

"With the exception of respiration, all the factors concerned in the heat regulation of warm-blooded animals are under the direct control of the sympathetic nervous system, and therefore subject to control by the functional activity of the thyroid and adrenal glands. Increased functional activity of these glands has the effect of stimulating the sympathetic. There is therefore both a nervous and a humoral apparatus for heat regulation. Stimulation of the sympathetic increases metabolism and thereby increases heat production. While it diminishes heat loss through constriction of the cutaneous blood-vessels, it increases heat loss through the stimulation of the sweat glands. This latter effect may be inhibited by the constriction of the cutaneous blood-vessels. In furry animals which cannot regulate heat loss by sweating this function is taken over by the arrectores pilorum: in these animals sympathetic stimulation increases heat loss through stimulation of the arrectores pilorum. This mechanism is, however, less efficient than that of the sweat glands.

"It follows, therefore, that stimulation of the sympathetic by increasing heat production and by preventing a compensating increase in the heat loss or actually diminishing it produces a type of fever: 'sympathetic fever.' Such a fever can be induced by increased functional activity of the thyroid and adrenal glands, even without the presence of bacteria. Evidence is adduced that in many of the fevers due to bacterial infections there is an increased functional activity of these glands. In fever there is a change in body temperature, or as it may be called, the 'internal thermal environment' due to the stimulation of the thyroid and adrenal glands.

"Conversely, the functional activity of these glands can be brought into play by changing the 'external thermal environment.' Exposure to cold, which calls for increased heat production and diminished heat loss, stimulates these glands to increased activity. Exposure to heat diminishes their activity. The thyroid and adrenal glands represent therefore a humoral apparatus for the heat regulation of the body. This accounts for the physiological and psychological effects of climate. A bracing climate is one which stimulates the sympathetic and the thyroid and adrenal glands, a 'relaxing' climate one which fails to stimulate them. The work of Leonard Hill and Argyll Campbell has shown that one of the effects of a bracing climatic environment, such as open air treatment for instance, is a rise in metabolism. But a rise in metabolism in itself does not account for the beneficial effects of such an environment. The explanation is to be found in the increased functional activity of the thyroid-adrenal apparatus of which the rise in metabolism is one manifestation."

He continues: "The conception of heat regulation as a function of the sympathetic which emerges from these conclusions, enables us to dispense with the idea of a heat centre or of several centres, which are supposed to function like a thermostat and which in fever are supposed to be 'set' at a higher temperature. It is curious that such a crudely vitalistic conception, which really explains nothing, should have dominated physiological and pathological thought for such a long time. Since heat regulation is a function of the sympathetic the so-called heat centre in the tuber cinereum is explicable as a group of nerve-cells representing the central connexions of the sympathetic."

We shall be in a better position to comment on the views put forward above after we have considered in further detail the question of fever.

The Meaning of Fever

In the preceding lecture fever was defined as a complex response of the body to infection in which pyrexia or raised temperature was but one of the manifestations. It is essentially a response in metabolism associated with a toxic disturbance of heat regulation. In fever the nervous control of temperature is altered but it does not appear to be thrown out of action entirely; it is merely disordered. The febrile patient still responds to heat and cold, but he is affected more easily than in health as though the nervous control were more labile. The diurnal variations in temperature still occur, though they may be altered in their range or even reversed, as in the so-called inverse temperature sometimes seen in cases of pulmonary tuberculosis. It is a case of altered regulation. Carl von Liebermeister, who was the first pathologist to investigate fever calorimetrically, enunciated the doctrine that in fever the temperature is adjusted to a new norma. Some distinguished pathologists still adhere to this view. They believe that in fever the body adjusts its temperature to a higher level than normal—as though tuned to a higher key—just as the regulator of a thermostat may be moved up a few degrees in order to keep an incubator at a higher temperature. That is to say, the balance between heat production and heat loss is adjusted at a higher level. For example, during muscular exercise heat production may be increased from 200 to 300 per cent., whereas in fever it is only increased from 20 to 30 per cent. Yet in the former the temperature remains normal, while in the latter it is raised (Boyd). Again, in exophthalmic goitre the heat production may be 80 per cent. above normal, yet the temperature of the body is rarely raised for the skin is flushed and moist.

The earlier investigators held opposing views as to the origin of fever. Liebermeister taught that the increased temperature was due to an increased production of heat. Ludwig Traube, on the other hand, held that it was due to deficient loss of heat. Hale-White in his Croonian lectures in 1897 brought forward evidence to show that pyrexia is not to be ascribed in all cases to one common underlying process, it being due in some instances to the one, and in some to the other. He says :—

> "It appears to me to be possible that the discussion has in a sense been beside the mark, for we know that most, if not all, fevers are due to the circulation of poisons in the blood, and there is no reason why we should believe that they all produce pyrexia in the same way. All collateral evidence is against such a view; many poisons accelerate the beat of the heart, but some act upon the vagus, others upon the accelerator nerves; many poisons produce diaphoresis, but jaborandi acts upon the peripheral terminations of the sudoriparous nerves while opium acts centrally. And I hope I shall, in these lectures, be able to bring forward evidence to show that sometimes pyrexia is due to an increased production of heat and sometimes to a diminution of the loss. If this can be done it will put an end to the discussion as to whether in fever the production of heat is increased or the loss diminished; but we shall have to discuss the question for each separate febrile disease" (THE LANCET, 1897, i., 1660).

We now know that even in the same fever one or other of these processes may predominate at different stages of the disease.

CHEMISTRY OF THE FEBRILE STATE

It is very difficult in our present state of knowledge to explain the manner in which invasion of the body by pathogenic organisms leads to the complex response we speak of as fever. It is suggested on the one hand that the toxins produced by the invaders directly affect the heat centre; on the other hand, it may well be that certain substances liberated from the damaged cells of the host are responsible. It has long been recognised that excessive katabolism of proteins is one of the most striking features of the febrile state. When considering the subject of hyperthermia we referred to the fact that the mere existence of pyrexia led to a further increase of metabolism and saw that a vicious circle might thus be set up. The chemical reactions of the body, like those occurring in a test-tube, are speeded up by a rise of temperature. It has been calculated that a patient with a temperature of 105° F. would manifest an increase of 50 per cent. in his metabolism and in his pulmonary ventilation because of the pyrexia alone. The enormous destruction of protein that occurs is shown not only by the increased output of urea, creatinine, and purine bodies in the urine, but also by the wasting and loss of weight that occurs in any prolonged fever. The output of phosphorus and sulphur is also increased for the same reason. The urea may be increased two- or three-fold in the urine. In typhoid fever this increased output of nitrogenous bodies may represent a loss of four or five pounds of muscle in a week.

Loss of weight, however, is not solely to be attributed to destruction of the proteins of the body. Doubtless loss of appetite and diminished intake of food play their part. In this connexion it is interesting to note that free hydrochloric acid is usually absent from the gastric juice if a fractional test-meal is carried out. The glycogen in the liver and muscles rapidly become exhausted. Fats are also destroyed though in lesser degree than proteins, and in the presence of a comparative poverty of carbohydrate some degree of acidosis is often met with. Acetone is frequently to be found in the urine. The rapid respiration characteristic of fever serves to reduce acidosis by eliminating more carbon dioxide through the lungs. The presence of acetone bodies in the urine of febrile patients does not exclude the existence of an alkalosis. Alkalosis is most likely to be met with in pyrexia associated with pulmonary lesions in which the oxygenation of the blood is effected with difficulty and in which hyperpnœa results.

Koehler has recently demonstrated (1923) that an alkalosis may be present in influenza. A slight alteration in the pH of the blood towards the alkaline side is found and is accompanied by a fall in the plasma bicarbonate. The occasional occurrence of tetany in connexion with the acute fevers lends support to Koehler's views. In a paper by Leach, Vickers, and Brown on the reaction of the blood in experimental pneumonia (1924), findings are given which suggest that, while an alkalosis due to increased pulmonary ventilation may occur in the early stages of the disease an acidosis subsequently develops. The development of the acidosis appears to be associated with an increased concentration of the acetone bodies in the blood, and the change in the pH of the blood towards the acid side and the higher grades of bicarbonate reduction, which are found in the terminal stages of the condition, appear to result from a ketosis (O. L. V. de Wesselow).

At the onset of fever and during the stage of rigor there is often increased diuresis due to the increased blood pressure, and copious diuresis often occurs as the temperature falls at the end of a febrile attack. During the height of a fever urine is diminished in amount, becoming concentrated and highly coloured. Urobilin may be present in considerable quantity, apparently resulting from increased destruction of hæmoglobin and in consequence some degree of anæmia is the rule. The urinary chlorides are diminished in all fevers excepting malaria, and the reason for their retention is not understood. It is quite different from the chloride retention of nephritis, for in nephritis the blood chlorides are high, whereas in fever they are low. They must therefore be retained in the tissues. Water retention also occurs; possibly this is to be correlated with the retention of chlorides in the body and the diminished excretion of urine. The diminution of the urinary chlorides is exemplified particularly in the case of pneumonia.

It is usually stated that in this instance they are retained in the inflammatory exudate in the lungs, yet in some cases where a crisis occurs without simultaneous resolution of the lung they make their appearance again in large quantities at and immediately following the crisis. Since the body requires a certain amount of sodium chloride for its metabolic processes and seeing that these are greatly increased during fever, it may be that they are being retained, especially if their intake in the food is deficient. Sollman, who investigated this question more than 30 years ago, concluded that the disappearance of the chlorides from the urine during fever is due entirely to the deficiency of the intake of salt in the food. He recommended that ½ oz. of salt a day should be added to the milk given to a fever patient.

OTHER RESPONSES

In some fevers the skin is dry and burning to the touch, the sweat glands being apparently paralysed by toxins. Pneumonia and scarlet fever are obvious instances. The sweating met with in acute rheumatism and acute pulmonary tuberculosis proves a notable exception to the general rule. The rate of the heart is increased and at the onset of a febrile illness when the arterioles of the skin are contracted the blood pressure is usually raised ; later, when the blood-vessels dilate and the heart is beating less powerfully, the blood pressure falls and the pulse becomes dicrotic, a phenomenon which is particularly well seen in cases of typhoid fever. We have seen that the respirations are increased in rate and there is an increase of CO_2 in the expired air on account of the great increase in metabolism which is occurring. The disturbance of the nervous system is shown by restlessness, depression, and, in more severe cases, by delirium, tremor, and subsultus tendinum.

It may be said that we are still in the dark as regards many of the phenomena occurring in the febrile state, that is, how far they are to be attributed to the state of pyrexia or how far they are the direct result of toxæmia. For instance, albuminuria is in some instances probably the direct result of the pyrexia, but it is so much more frequent in diphtheria and scarlet fever than in other febrile conditions that in these instances it is almost certainly due to specific toxins. In the same way, leucocytosis, though so often associated with pyrexia, can scarcely be attributed to the febrile state, for it is absent in the enteric group of fevers, malaria, influenza, measles, German measles, and tuberculosis. Constipation is of frequent occurrence in the febrile state, and if Cramer's views are accepted this could be explained by the inhibition of intestinal movements from sympathetic stimulation. The same observer also attempts to account for the terminal bronchopneumonia met with so frequently in the infectious fevers. The pulmonary œdema and congestion which arise as the result of prolonged sympathetic stimulation provide a ready soil in the lung for the localised growth of invading organisms.

Other Theories of Fever

So far we have assumed fever to be the result either of the direct action of toxins produced by invading organisms on the nerve-cells in the tuber cinereum, or else on the tissue cells of the body, from which some hypothetical substance is set free which in turn upsets heat regulation. There are, however, other theories of fever which must be more or less briefly noticed. One of these is usually referred to as the water-shift theory of fever. It postulates that as a result of infection there is a shift of water from the blood to the tissues so that the blood becomes concentrated.

As a result of the reduction in blood volume blood is no longer avilable for the skin vessels and the resulting vasoconstriction by diminishing heat loss brings about pyrexia. Much stress is placed on the increased concentration of the blood. It is known that conditions which lead to concentration of the blood such as hypertonic saline concentrated sugar solutions, and certain purgatives may bring about fever and probably do so by increasing the difficulty of perspiring, but in fever the concentration where it exists has not been shown to be the primary cause and may well be a secondary result. What exactly happens to the sodium chloride which leaves the blood has yet to be elucidated, and it has yet to be shown that it takes water with it. Until we know this the water-shift hypothesis appears very uncertain (R. J. S. McDowall).

Another theory of fever is that of lack of free water. There is reason to believe that the greater part of the water in the blood and tissues is bound by the colloids and possibly to some extent by the crystalloids and that blood and protoplasm may be looked upon as hydrates. It is only the free water that can be readily excreted in urine and sweat and which migrates readily from vessels to tissue spaces and back again as need arises. Such an hypothesis serves to explain fever as a lack of free water impairing the temperature regulation capacity of the body (Balcar, Sansum, and Woodyatt, 1919).

A more fascinating theory is that put forward by Cramer and it is necessary to review this in greater detail. According to this observer, as we have already seen, the adrenal medulla, the thyroid, and the sympathetic nervous system constitute the heat-regulating system of the body. His theory rests materially upon the demonstration of extreme secretory activity in the adrenal medulla in fever following the experimental injection of β-tetrahydronaphthylamine or exposure of an animal to cold. In the case of an animal which has been subjected to either of these procedures the adrenal is removed and thin slices are subjected to the action of osmic acid vapour. By this method the specific secretory granules of adrenaline in the medullary cells are rendered visible and their behaviour under various conditions can be studied.

Adrenaline is an easily oxidised substance and reduces readily osmic acid to the black lower oxides or possibly even to the metal itself. If a section of a normal gland which has been treated in this way is examined the cortical cells of the adrenal are seen to be filled with black globules of lipoids and the medullary cells with much finer black granules of adrenaline. It is possible to distinguish between these two groups of substances by immersing the section in crude turpentine, since the turpentine acts as a solvent upon the lipoid material without affecting the adrenaline granules.

In experimentally produced pyrexia Cramer has demonstrated the almost explosive discharge of adrenaline, the granules which have left the cells of the adrenal medulla appearing in the capillaries which separate the alveoli of the gland. When in induced pyrexia animals are killed at a later stage the cells are found to be completely denuded. Signs of similar activity can be demonstrated in the thyroid. The gland becomes intensely congested, numerous capillaries open up between adjacent alveloi and between the lining cells and the wall of the alveolus, the amount of colloid decreases and loses its affinity for hæmoglobin. The lining cells become columnar and the mitochondria become more distinct. On exposure to an external temperature of 37° C. the gland passes into a resting condition similar to that which is observed after thyroid feeding ; the alveoli become distended with deeply staining colloid and the mitochondria become indistinct.

Further evidence in favour of Cramer's theory of fever may be mentioned.

Similar changes to those occurring in experimental fever have been found in certain varieties of fever in man. In certain rare cases of pyrexia of unknown origin the only lesion found on post-mortem examination has been hæmorrhage into the suprarenal gland, and I hope to make further reference to this condition at a later stage. Heat regulation is impaired but not destroyed when the thyro-adrenal apparatus is eliminated by disease as in myxœdema and Addison's disease. It is found that injection of β-tetrahydronaphthylamine into a thyroidectomised animal induces a pyrexia of lesser degree than occurs in a normal control. Experimental hyperthyroidism and experimental hyperadrenalism produce two different types of fever; the one elicits a hectic type, the second a rapid hyperpyrexia.

I will bring this subject to a close by quoting a paragraph from Hadfield and Garrod's "Recent Advances in Pathology" (1932).

> "The significance of these results is questioned by Stewart and Rogoff (1922) on the ground that hyperpyrexia can be induced by means of morphine in cats when adrenal secretion has been totally inhibited by removing one adrenal and cauterising the medulla and severing the nerves of the other; this in spite of the fact that with intact adrenals this hyperpyrexia is accompanied by an increased adrenalin output and a diminution in chromaffin content in the medulla."

Is Fever Beneficial or Not?

The question whether fever is beneficial or not can hardly be answered satisfactorily in the present state of knowledge. We have only to recall the seriousness of those infections in old and enfeebled subjects when unattended by any appreciable rise of temperature to assert that its absence is to be feared. It would appear then that the body is able to deal more effectively with the invading organism when the temperature is raised, and to this extent pyrexia is to be regarded as a defensive mechanism. A very high temperature, 107° or 108° F., is certainly harmful and, if continued, will result in death from injury to the nerve-cells. But there is no ground for believing that a moderate degree of fever is detrimental, and it is not necessary to attack it with antipyretic drugs. The bounding pulse of fever is evidence of the increased energy of the circulation and it is largely by the blood stream that protective substances are carried to every part of the body. In the case of infected animals it has been shown that agglutinins and bacteriolysins are produced more quickly and in larger quantities if the animals are kept at a moderate elevation of temperature than in control animals kept at ordinary temperatures, but, as R. T. Hewlett points out, very high temperatures inhibit these immune reactions. It is well known that high temperatures inhibit the growth of bacteria, but it is only in severe fevers that body temperature could have any definite influence in this direction, and such an argument is unconvincing. Temperatures high enough to produce such effects would induce cloudy swelling of the parenchymatous cells of the body.

PRINCESS BEATRICE HOSPITAL.—This institution (formerly the Kensington, Fulham, and Chelsea General Hospital) is in serious financial difficulties. The Marquess of Carisbrooke, the president, has addressed a circular letter to subscribers and donors in which he says that its financial position is precarious, and that the board has decided that it will have to be closed down altogether unless in the near future a considerable sum is obtained. The hospital, which serves a district with 400,000 inhabitants, last year dealt with 1646 in-patients and 4547 street accidents and casualties. There is a debt of £8000 on maintenance account and £68.000 on building and equipment account.

FURTHER OBSERVATIONS ON FILARIAL PERIODICITY

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With a Laboratory Report by

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SINCE the publication of our last paper, entitled Some Recent Observations on Filarial Periodicity,[1] we have had the opportunity of studying another case of *Filaria bancrofti* infection with a heavy infection of filarial embryos in the blood.

The patient was an Indian lascar, aged 26, from Calcutta, who sought admission to the Royal Albert Dock Hospital on account of rheumatic pains in his legs and abdomen (March 10th, 1933). On examination no outstanding clinical signs of filariasis could be found with the exception of enlarged femoral and inguinal lymphatic glands. On X ray examination small shadows were present at the left pelvic brim and also at the level of the twelfth rib—appearances which might be interpreted as calcified filariæ; meanwhile a uroselectan investigation of the renal tract showed nothing abnormal, the small shadows being present in the same situation as in the plain radiogram. As regards laboratory examinations, the night blood contained numerous embryos of *Filaria bancrofti*. The Wassermann reaction was positive + + and the Kahn test + + + +. The blood counts were up to the normal and an eosinophilia of 5 per cent. was present. In the fæces trichuris eggs (17 per c.cm. by the floatation test) were present.

As the patient came from the same district as that of the case we reported in our previous paper,[1] it was decided to continue the study of the embryonic periodicity of the *F. bancrofti* with a further series of accurate counts over consecutive four-day periods. The same technique as described in the previous case was again used, but in order to make these observations correspond with the earlier work on the subject, Low's standard [2] 20 c.mm. of blood was used as the amount for each count.* Thick wet film embryo counts were again found to tally within 0·5 per cent. of error factor against dry film counts.

LABORATORY REPORTS AND FILARIAL COUNTS

We are much indebted to Mr. Walters for the very careful and accurate observations carried out on the case. This involved sitting up for many nights, taking the blood at two-hourly intervals and counting thousands of embryo filariæ.

The first observation was one of four days of two-hourly counts taken consecutively from 2 P.M. on March 20th, 1933, until 12 noon on March 23rd, and it illustrates the regularity of normal nocturnal periodicity (Fig. 1). It will be noted that the peaks of the waves were reached at 2 A.M. on the first two nights, but came forward to 12 o'clock midnight for the third and fourth nights. This small discrepancy may be due entirely to experimental error or, more likely, to the fact that the patient fell asleep earlier on the third and fourth nights than on the first and second, thus giving an impetus to an earlier influx of embryos.

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* This is double the amount used in our previous paper (March 4th, 1933).

The second observation was also one of four days of two-hourly counts taken consecutively from 2 P.M. on March 27th, 1933, until 12 noon on March 30th, and illustrated an attempt to influence the periodicity of the embryo filariæ by means of reversing the life habits of the patient.

A meal was given to the patient at 11.30 A.M. on March 27th; slept from 2 P.M. to 5 P.M.; awake but drowsy at 6 P.M.; slept from 8.45 P.M. to 12 midnight. Patient roused at 2 A.M. and given a meal; taken for a short walk from 2.30 A.M. to 3 A.M.; back to bed at 4 A.M.; awake until 7 A.M.; slept from 7 A.M. to 9 A.M.; given a meal at 11.30 A.M.

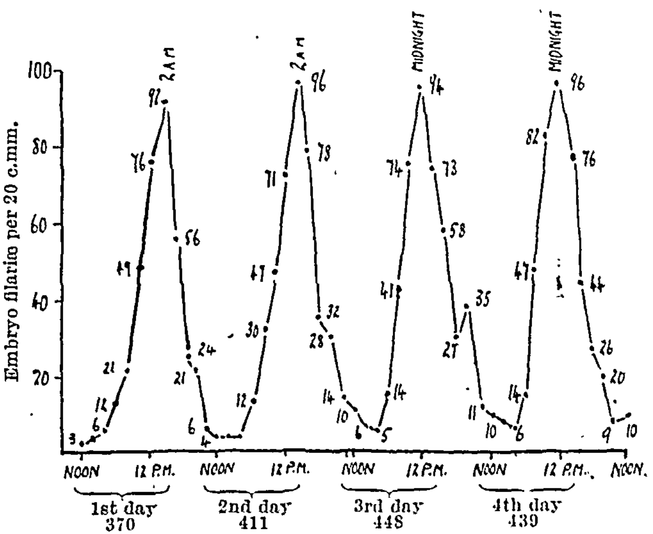
This was the routine strictly adhered to over the four-day period of the experiment, and it will be seen that the patient was resting or asleep from 12 noon until 12 midnight during each successive 24 hours. The graph of results showed no irregularity during the first day; a slight flattening out of the curve between midnight and 6 A.M. on the second day indicating a less rapid fall in the number of embryos; a marked irregularity on the third day, during which the patient was taken out for a car ride between the hours of 2 A.M. and 4 A.M. and kept awake longer until 6 A.M.; and a marked fall in the total number of embryos at midnight on the fourth day, counterbalanced by a marked increase of the total numbers at midday.

Reviewing this experiment it was decided that in order to achieve any satisfactory survey of the variation in embryonic periodicity in the patient's blood stream during the period of reversed life, it would be necessary to continue the observations over a period longer than four days. It was therefore decided to reverse the patient's life once more, but not to commence the observations until the fifth day as the first four days had already been done. In this way an eight day's chart was obtained. The reason for always selecting four-day periods was that the patient's fingers became very sore after being subjected to so much continued pricking.

Accordingly the patient was transferred to a room which was kept darkened during the day and artificially lighted all night. His meals were served at hours of the night corresponding with the usual day times, and between 12 midnight and 3 A.M. he was taken out for exercise and then given light duties of trivial tasks until 4.30 A.M. From then on he amused himself until 8 A.M. when he retired.

Counts were begun at 2 P.M. on the fifth day and were continued at four-hourly intervals for four consecutive days. Although every precaution was taken to ensure quiet rest for the patient, his sleep during the day was not so continuously sound as that during the night. He slept best during the period immediately after he retired—namely, from 8 A.M. to 12 noon, but after having been refreshed by this deep sleep he would mostly doze and sleep only lightly from noon until 6 P.M. when he breakfasted.

FIG. 1



Average number 417

Total embryo filaria counts

It will be seen (Fig. 2) that the first counts done during the fifth day show a marked increase in the number of embryos present at midday, there being 23 present as against an average of 5 in the normal curve seen in Fig. 1. Also, that the bottom point of the curve, denoting the smallest number of embryos counted, is reached at 6 P.M. as against 2 P.M. on the normal curve. This indicated a moving-on of the cycle towards reversal. On the sixth day there was a marked decapitation of the peak of the curve showing the midnight counts increased to 59 embryos per 20 c.mm. of blood and the midday count increased to 67 embryos per 20 c.mm., whilst the bottom point of the curve is reached between 6 P.M. and 8 P.M. From the sixth day onward to the eighth there was no change in the patient's habits, and he continued to sleep well from 8 A.M. to 12 noon and then lightly doze and sleep until 6 P.M. Correspondingly there is little or no change to be observed in the curve. The peaks of the curves for the seventh and eighth days remained decapitated and the midday and midnight figures run in comparatively close parallel.

The total number of filaria embryos which appear during each 24 hours is the next interesting and suggestive observation. In the normal curve (Fig. 1) the total embryo counts are as follows: first day, 370; second day, 411; third day, 448; fourth day, 439. These figures give an average number of 417 embryos per 24 hours over a period of four normal days and nights. During the first four days of the reversed life experiment, the total embryo counts were: first day, 466; second day, 416; third day, 452; fourth day, 401; giving an average number of 434 embryos per 24 hours over a period of the first four days and nights of reversed life.

Continuing the foregoing observation, the total number of embryonic counts from the fifth to the eighth day of reversed life are: fifth day, 472; sixth day, 503; seventh day, 463; eighth day, 415; giving an average number of 463 embryos per 24 hours over a period of fifth to eighth days of reversed life.

The average number of embryos counted during every 24 hours throughout the eight days is 448 per 20 c.mm. of blood, and the average shown in the normal curve (Fig. 1) is 417. The difference between these two average figures is negligible from the experimental point of view, but the curves are vastly different. In the normal curve the peaks are regular and appear between 12 midnight and 2 A.M., whilst the minimum counts occur at 2 P.M. From the sixth to the eighth day of reversed life the curves fail to peak, the midnight to midday counts are nearly identical, and the minimum counts occur at 6 P.M. to 8 P.M. Therefore it seems most likely that the same numbers of filariæ embryos are always poured into the blood stream every 24 hours, no matter what variation of sleeping and waking of the patient is brought about, and this experimental evidence points strongly to daily migration and reappearance of the same undamaged embryos *rather than to regular death and exact numerical parturition of embryos by the adult female* worm or worms. It seems most unlikely that female *F. bancrofti* should give an even yield of embryo when subjected to adverse circumstances.

Two weeks after the termination of the reversed life experiment the embryos were found to have returned to their normal nocturnal periodicity as shown in Fig. 1, and then the following animal inoculation experiment was kindly carried out for us by Dr. H. M. Hanschell. At 1 A.M. 20 c.mm. of blood was taken from the patient in the usual manner and the embryos were found to number 92; 5 c.cm. of blood was removed from the median basilic vein of the patient and immediately transferred to the heart of an ether anæsthetised guinea-pig. The animal fully recovered inside of three minutes, and 20 c.mm. of blood was then taken from the marginal vein of the ear and examined for embryos; none was detected. Five minutes after the transfusion the animal was killed by means of a sudden sharp blow on the back of the neck and a post-mortem examination was held at once. The heart was first punctured and 20 c.mm. of uncoagulated blood removed for standard thick film preparation. Smears were then prepared from the heart, lungs, liver, spleen, kidneys, and brain, and the respective tissues sent to the laboratory for sectioning. No embryos were detected in the marginal-vein or heart-blood films, and none in serial sections made right through the organs. Thus 23,000 live filarial embryos were transferred into the heart of the guinea-pig and five minutes later no trace of them could be found in the heart-blood or organs of the animal!

Further experiments to observe microscopically the action of guinea-pigs' blood on the embryos were planned, but unfortunately the patient, having become again fit for work, was obliged to leave hospital and rejoin his ship. Thus we were unable to ascertain whether the embryos were destroyed immediately when transferred to the guinea-pig or not; but it is certain that if they were not destroyed they had not migrated to any of the principal organs, which were thoroughly examined.

For the further elucidation of this, which we considered a crucial matter in the periodicity problem, further experiments on a more extended scale are necessary. What is it that determines the sudden death and disintegration of the embryo in incompatible blood in the guinea-pig? Bahr's experiments in Fiji on the embryo filariæ on a slide show that they are capable of remaining active and unchanged in their morphology in compatible human blood as long as three weeks, and the same phenomenon has been found to hold true for *Loa loa* embryos; but the moment they are transferred to incompatible blood they perish; it is to our minds inconceivable that in the normally infected filarial subject a similar rapid destruction takes place, when at the same time it can be proved that the filarial embryo are capable of living in the blood of the same patient outside the body and under artificial conditions for several weeks.

The following points have been brought out by these observations:—

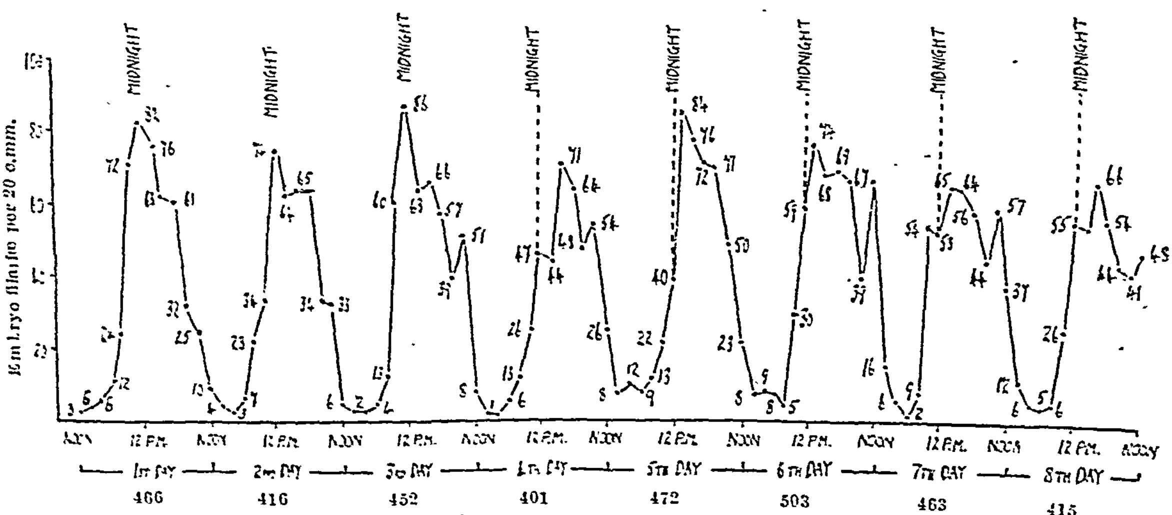
(1) That the curves illustrating this paper indicate to our minds still more emphatically than in our last paper that the phenomenon of periodicity is in some manner dependent upon the habits of the human host.

(2) That the curious phenomenon, so far termed "reversed periodicity," is probably not the correct interpretation. "Irregular periodicity" would be more correct, and the same irregularity can be seen on an analysis of Mackenzie's original case in blood taken every three hours under a $\frac{5}{8}$ in. cover glass.[3]

(3) The type of "irregular curve" shown on the sixth, seventh, and eighth day in Fig. 2 is similar to that obtained in the non-periodic Fijian filaria,[4] and we consider it very necessary that similar observations should be carried out in the Pacific Islands with accurately measured quantities of blood—namely, 20 c.mm. It is hoped that an early opportunity will present itself of continuing this work on the non-periodic *F. bancrofti*.

(4) Another significant fact, as shown in the figures, which also emerges from the observations of Mackenzie, Yorke, and Blacklock, and Smith and Rivas, is that the minimal number of embryo filariæ

FIG. 2



Average number 448

Total embryo filaria counts

in the circulation, whether in reversed or in normal life, occurs at about 6 P.M., and what is the exact significance of this can, at present, only be conjectured.

THE MECHANISM OF FILARIAL PERIODICITY

As regards the mechanism of filarial periodicity, Clayton Lane has recently written upon this subject extensively.[5] As he says:—

> "Periodicity in *Filaria bancrofti* is evidently produced in one of two ways. Either there exists in the circulation a fixed or almost fixed filarial population which shelters in some internal part of the body during the day and reaches the cutaneous capillaries at night only, or parturition is so timed that microfilariæ enter the blood stream at night only. The latter alternative implies, first, simultaneous cyclical parturition, using the term with the same loose regard to exactness as occurs in the reference to simultaneous cyclical sporulation in the tertian or quartan malaria parasites; and, secondly, daily death of the cyclical brood."

Manson considered these two theories over 50 years ago and came to the conclusion that the first was the correct one. To try to prove this he experimented on dogs infected with *Dirofilaria immitis.*[6] In such an infection there is a certain periodicity though not so perfect as in *F. bancrofti.* Embryos are never entirely absent from the peripheral blood, though their numbers are always greater during the evening and night than during the day. The time of greatest scarcity is in the early morning. Having discovered this Manson took an infected dog and examined a drop of its blood at 6 A.M., this showing 82 embryos. He then administered a dose of prussic acid, did an autopsy, and counted the numbers of embryos in drops of blood from the different internal organs. The slides from the lungs (three in number) showed enormous numbers of embryos—viz., 4582, 1591, 2738.

In the heart of the dog four female and three male adult worms (*D. immitis*) were present. Of the four females three were found to be crowded with embryos at all stages of development, whilst in one the uterine tubes were found to be quite empty, save for a few dead embryos near the vaginal opening and the debris of a former pregnancy.

Taken in conjunction with the register of embryos free in the blood at different times of the day, he concluded that the embryos of *D. immitis* do not die or disappear after a short existence of less than 24 hours, but that they rest periodically in the minutest branches of the pulmonary artery; and that when they disappear from the general circulation they are to be found in the lungs. Further proof of this was forthcoming when in 1897 Manson in London had the opportunity to conduct an autopsy on a classical case of *F. bancrofti* infection which showed an exact nocturnal periodicity. The patient died about 8.30 one morning after taking a large dose of prussic acid. At the post-mortem the larger blood-vessels of the thorax and the blood-vessels of the lungs, just as in the dog, contained enormous numbers of filarial embryos.

Low[7] described a somewhat similar case of a slight infection in a Barbadian negro, death in this case taking place at 10 A.M. At the autopsy embryos were found in the lungs only. Clayton Lane, however, does not accept these cases as proving that the embryos were necessarily there during the life of the patient, and believes they accumulate in these situations from the lymph trunks at or after death only. It is not easy to see how this could have taken place in Manson's cases of the dog and human subject as death was sudden, owing to the large dose of the prussic acid taken, and therefore all the embryos must have been immediately immobilised. Even if the embryos had escaped in these poisoning cases or remain alive in cases dying of ordinary causes, how could embryos enclosed in a sheath find their way from the periphery, from the legs and arms, into the large vessels of the thorax and lungs after the circulation has stopped and the blood and lymph are no longer flowing.[3] Clayton Lane believes it is physically unthinkable that filarial embryos can hold their position in the overwhelming current of the large blood-vessels, and likens this to a man keeping his position swimming against the current half-way down the Niagara Falls. The fact nevertheless remains that apparently they are able to do so as the following experiment shows. The peripheral blood of a Barbados blackbird (*Holoquiscalus fortirostris*) when examined at 10.45 A.M. showed only one filarial embryo in an ordinary thick film. It was then killed, its thorax opened, and blood was taken from the right heart, which was still beating. Over 200 filarial embryos, in a similar thick film, were counted, and in blood from the lungs over 50. This experiment, together with other and later observations made upon *Dipetalonema perstans,*[8] in Uganda, seem to us to point to a seat of special selection in these organs, especially in the lungs. Why embryos should be able to hold their own against the currents of blood in the heart and large vessels is not clear, but it is a fact that they do. The same is true for the adult *Dirofilaria immitis* of the dog which live in the right ventricle of the heart, and which must have taken up their position there, as far as we know, on entering the definitive host after quitting their intermediary, the mosquito.

Indeed, here we are driven back to one of Manson's original suggestions based upon his observations on the filariæ of the Chinese black-necked grackle (*Gracupica rigricollis*),[8] that the embryos are provided with an oval spicule and surrounding papillæ by means of which they are able to adhere to the blood-vessel walls, and it is probable that the human embryo filariæ do the same thing. It is a common observation that embryo *F. bancrofti* are able to adhere to a coverslip and to clumps of red blood corpuscles by this means, and no other use has been suggested for this particular organ, save as a means of anchoring the embryo to the capillary wall.

Further, there is no violent current in the capillaries of the lungs, and once carried there by the pulmonary arteries the embryos should have no difficulty in maintaining their position. Possibly they are attracted there chemotactically to get the benefit of the freshly oxygenated blood. What factor supplies the stimulus to urge them to come out again at night is another matter, just as what is the corresponding stimulus which makes the diurnal embryos of *Loa loa* retire from the peripheral blood at night to some place inside the body at present unknown. We also know that ascaris and ancylostome larvæ are held up in the lung capillaries on their journey to the intestine.

Another point, to our minds, against a daily destruction of the embryos, is the long time that these will live outside the body in sealed blood at room temperature. The conditions are not strictly analogous, of course, but one must take all factors into consideration.

There are many other points that one could criticise in the deductions Clayton Lane has drawn from the study of Prof. F. W. O'Connor's sections. The fact that adult filariæ are found all with their uteri empty in blocked and therefore pathological lymphatics, does not necessarily mean that this *is* what takes place when the parasites are inhabiting normal lymphatics. As has often been pointed out, heavy blood infections with embryos may not be associated with any observable pathological lesions at all. There are other strange happenings in *F. bancrofti* infections which are not easy to explain. The counts described in the paper show that the total number of embryo filariæ present each 24 hours appears to be constant, regardless of external conditions, and if one does systematic counts with measured blood every night over weeks and even months, one finds that the nightly number of embryos may vary very little. This, we hold, indicates a more or less constant stream of embryos emerging from the uteri of the adult worm daily, with a corresponding destruction constantly going on, otherwise how account for the constant figure.

There are many other points awaiting solution in *F. bancrofti* infection; more extensive study of the non-periodic human filariæ and further accurate studies on the *Dirofilaria immitis* of the dog are required. When these have been accomplished then we may learn something more about the strange phenomenon of periodicity. For the moment we, just as Manson did some 50 years ago, believe that filarial periodicity is best explained by parturition going on more or less continuously, the young being, as Manson put it, nearly constantly carried along the lymphatics and thoracic duct to the blood, while the excess that would in time take place is checked and kept more or less constant by a mortality amongst the older and effete embryos.

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TREATMENT OF
EXOPHTHALMIC GOITRE WITH DEEP X RAY THERAPY

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IN all, 61 cases are included in the present series. The minimum period since commencement of treatment is three years and the maximum period of subsequent observation nine years. So far as is known, no series of cases treated by deep therapy has hitherto been published, and although successful cases treated by ordinary X rays have been reported from time to time, notably in this country by Dr. Florence Stoney,[1] yet the general impression has been that such treatment, to say the least, is uncertain. A note on a further 40 cases is appended, in which more recent treatment has been given.

Twenty of the combined cases were directly under the care and observation of one of us (E. P. P.) who classifies and reports upon them as shown in Table I.

TABLE I

Case.	Sex.	Age.	Length of history (years).	B.M.R., per cent.	Time since treatment (years).	Gain in weight, (lb.).	Improvement.	Class.
1	F.	40	10	60	7	0	L.	2
2	F.	52	½	0·2	4½	2½	G.	3
3	F.	48	1½	0·5	3	6½	,,	2
4	M.	43	½	37·3	6	19	,,	1
5	F.	44	5	28·3	3	46½	,,	1
6	F.	30	1½	102	2¼	21	,,	1
7	F.	45	10	39·1	2	11	,,	1
8	M.	52	2½	26·2	4	12	,,	1
9	F.	38	¾	41·2	7½	10	,,	1
10	F.	53	—	40·4	5	39	,,	1
11	F.	45	4	69·4	6	—	,,	2
12	F.	36	½	0·4	2	32	L.	2
13	M.	16	.1½	43·6	8	19	G.	2
14	F.	53	¾	0·3	2	26	,,	1
15	F.	56	1	31·4	2	24	,,	1
16	F.	29	1	21·1	5½	—	,,	2
17	F.	22	2	0·6	7¾	9	,,	2
18	F.	27	½	53	7	13	,,	2
19	F.	60	¾	22·1	3½	—	,,	1
20	F.	38	2¼	0·6	2¾	10	,,	1

L. = little and G. = great improvement.

Remarks.—Case 1: Rheumatoid arthritis. 2: Auricular fibrillation for 2½ years. 7. Mild diabetes. 11. Mitral stenosis. 16. Treatment not completed.

The results of treatment are tabulated in two ways. Patients were asked to state whether they considered they had improved greatly or a little or not at all since treatment had been begun. From this point of view the results are gratifying, as 18 out of 20 stated that their improvement was "great." The final column of the Table gives results in accordance with Dr. F. R. Fraser's classification.[3]

Class 1.—Patients who can do full work.

Class 2.—Patients who can do their work with difficulty or are obliged to do lighter work.

Class 3.—Patients who are obliged to lead an invalid life.

The present state of the patient has been taken as the only criterion. No difference has been made, even though a present disability might not be thought to be due to the original thyroid disease. It has the disadvantage of making the outlook a little more unfavourable, as is illustrated in the following two cases.

Case 2 (Class 3). A year later her only symptom was occasional tachycardia; all other signs had disappeared. But the concurrent rheumatoid arthritis was worse and she was crippled. Case 11 (Class 2) was admitted for further treatment in April, 1933. She was found to have developed *mitral stenosis*, which caused some disability. There were no signs of hyperthyroidism. The B.M.R. was + 2 per cent.

The first patient (Case 13) was a boy who had previously been treated with ordinary X rays and whose age, 16 years, is generally considered a contra-indication to operation. He was treated first in April, 1924, when a dose of 25 per cent. was given to the thyroid gland. He was treated six times in all between April, 1924, and March, 1928. His basal metabolism before treatment was + 43 per cent. At Christmas, 1932, he wrote stating he was working at Pickford's lifting sugar, milk, and other heavy articles without trouble. In July, 1933, he was lifting packages of 1 cwt. and over; his only symptom was at times a tightness of the throat with extra heavy effort. As a result of these repeated small treatments on top of his previous ordinary X rays he developed a capillary telangiectasis of the skin over the thyroid. In the light of further experience the treatment given was much too light and too often, although the end-result was satisfactory.

Deep X ray treatment suffers perhaps one disadvantage as compared with operation. It is only in the mildest cases that a single treatment is required, consisting of a series of four exposures spread out over a week or ten days. The second treatment follows in two or three months; but the patient may feel so well by now that she refuses to give up further time to treatment in hospital. The surgeon, on the other hand, usually aims at a cure after a single operation.

Case 16, a nurse, was one of this kind; her symptoms were more severe than is indicated by a B.M.R. of + 21 per cent. Her pulse-rate was 120, and she was so weak that towards the end of the day she could not walk upstairs without holding on to the banisters. She only had one treatment of three exposures in October, 1926. She was seen two and a half years later because she wanted to pass her Central Midwives Board examination and she was not allowed to enter without a medical certificate. She said that she did not now feel any weakness. She became hot on exertion, but there was no palpitation. The beat of the heart was forcible and the pulse-rate 120; there was some exophthalmos. She was given the certificate but was told there was some activity of the thyroid still present which it would be advisable to treat. She wrote later saying she had been allowed to continue her training. In March, 1933, she wrote that her eyes were prominent, she was shaky after exertion or excitement, and the pulse-rate was quick after exertion. The neck was not swollen. Apart from these symptoms she had been very well indeed for the past two years. Since November, 1932, she had been night sister; she did not think she could do heavy nursing which entailed lifting. She falls into Class 2, but with further treatment might have been graded higher.

Case 9 illustrates the very gradual improvement that may take place in a patient insufficiently treated, and the improvement in this case was not attributed by the patient to the treatment at all, although Dr. A. C. Lewis, of Rochford, wrote three years afterwards that she had been in very good health since her treatment at Guy's for a goitre which was much smaller, and that she did not have attacks of tachycardia. The patient wrote in 1931 as follows: "You state you are trying to assess results from the treatment; I think it only right to tell you that I do not honestly think I derived any benefit from it, and for that reason I did not return for the third treatment. I did not notice any change in my condition until late in 1927 (last exposure June 4th, 1926); I apparently got stronger after that and gradually regained my normal health. I have not filled up the form you enclosed, under the circumstances. Whilst in the hospital every kindness and courtesy was shown me, for which I was very grateful; but feeling as I do about the treatment I think it fairer to write and say so." She has been placed in Class 1!

Case 18, another nurse, may be taken to illustrate the criteria for Class 2. She came first under treatment in January, 1926, and she had six small treatments up to May, 1927; at the present time she would be treated more vigorously. At the end of 1927 her B.M.R. was + 9·5 per cent. and no further treatment was advised. She writes that in March, 1933, she has palpitation at times with breathlessness and slight shakiness; she walks upstairs slowly. In 1932 she did heavy surgical nursing for five months; it is during these times that she becomes conscious of her heart if she gets overtired. She adds that she is very well indeed on the whole. She has been placed in Class 2.

TREATMENT (BY W. L. W.)

There was little to go on except previous experience with ordinary X rays. Tentatively a total depth dose of about 25 per cent. of the skin erythema dose was tried. It was found that two, three, or even more treatments were necessary. The depth dose was then increased to about 50 per cent. and, as this was found to be well tolerated by the thyroid, the total amount was gradually increased to what was formerly called the sarcoma dose—a depth dose of 80 per cent. S.E.D.—and for the past years this has been more or less the standard. With this dosage in the milder type of the disease one treatment only and in the severer type two treatments are usually sufficient. This massive treatment is practically a bloodless operation and the quickness of results apparently equals that of surgery, so that one of the chief claims of the latter is more or less neutralised.

It is interesting to note that five cases in the series had previously been treated with ordinary X rays without any marked benefit. This only confirms what the writer has already observed in the leukæmias and in Hodgkin's disease: that cases which had ceased or failed to respond to ordinary X rays will still improve if treated by deep therapy. In time it may be possible to determine the optimum wavelength for any particular disease. That toxic goitre is apt to recur is evidenced by the fact that post-operative recurrences are stated to be from 5 to 20 per cent. according to the experience of different observers. In this series six cases were of this class, and treatment by deep therapy was found to be very effective.

Adenomas, if associated with severe symptoms, would probably be safest treated by deep therapy first, and if it caused disfigurement subsequent removal could be carried out. One case in the present series was operated on one year after the deep therapy and is quite well to-day. There was an interesting case of recurrent adenoma. The patient had previously been operated on three times and refused to have any further operation; she came with a history of toxic symptoms for the previous nine months. She had three large adenomas the size of hen's eggs and several smaller ones. As the result of treatment the toxic symptoms disappeared, the large adenomas have slowly diminished to about one-half their original size, and the smaller ones are barely palpable. No new ones have appeared in the four years she has been under observation, and although the patient could obviously be benefited from the æsthetic point of view by surgical removal, she refuses.

END-RESULTS

Consideration of the cases shows but little difference in the final result whether the patients were treated (as originally) with comparatively small doses repeated as necessary or with the present massive dosage. It is in the time taken to achieve the result that the great variation is found. In all those who depend upon their own effort for a livelihood, or who are the mainstay of their home and family, early recovery is of the greatest importance. For this reason the massive dosage is the best. The earlier the treatment the more satisfactory is the result likely to be. The longer the delay the greater the strain on the heart and the slower the recovery. In the severer cases at least a year should be allowed. Surgical treatment was considered in two cases. One patient (Case 13), owing to the slowness of recovery, was examined by a surgeon, who was unable to operate owing to the condition of the skin; this showed a telangiectasis of fine capillaries involving the thyroid area, which was the result of further treatment after previous ordinary X rays. The other patient was advised operation by the surgeon but refused. Both these have subsequently made marked improvement and are well to-day. Rest is an important element in quick recovery, but in many cases, from the very nature of the surroundings, it is very difficult to obtain. One month should be the minimum in all cases.

SUMMARY

The results given in this paper compare very favourably with other published results. It is to be noted that not one patient has died of the disease up to the present.[*] If further experience bears out these results, the treatment of exophthalmic goitre by deep therapy should become a very formidable rival to any other method.

Ambulatory cases.—Where early recovery is important a full "sarcoma dose" should be given. If time is not a factor, medical treatment may be followed later by radiation if there is failure to improve. A treatment consists of a series of four radiations—right, left, front, and back—spread over five to seven days, with the patient in bed. Total depth dose = 80 per cent. S.E.D.

Severe cases.—If associated with adenoma, preliminary radiation and later removal when a source of annoyance are advised. With general thyroid enlargement radiation is given and should be repeated in two to three months if necessary. With no marked improvement in one year, then either surgery or further radiation is indicated. A treatment consists of a similar series spread over eight to ten days. Total depth dose = 90 per cent. S.E.D. to allow for dispersion.

Grave cases.—Combined medical treatment with radiation is given.

Recurrences.—Radiation is usually successful in post-operative recurrences. If recurrence takes place after previous radiation then either a further treatment or surgery is necessary. In very grave cases a series of five radiations is advised, four as above and one extra to the whole thyroid region from the front, spread over five to six weeks. Total depth dose = 100 per cent. S.E.D.

TABLE II.—*Published Results*

Treatment.	Observers.	Cases	Percentage in each class.			Deaths.	
			1	2	3	Hosp.	Later
Surgery.	Mayo Clinic	677	65	12·5	5·5	3·5	15
X rays.	German Stat.	754	66	14	1	—	—
X rays.	Sielman (*a*)	328	50·5	40·5	5	—	—
X rays and rest.	Solomon	100	70	27	3	—	—
X rays.	Stoney (*b*)[1]	176	45	37·5	12	—	5·5
Medical.	Campbell[2]	88	37·5	33	12·5	9	8
Medical.	Fraser (*c*)[3]	64	36	23·5	4·5	4·5	36
Surgical.	Fraser	72	61	28	3	8	—
Deep X rays.	Poulton (*d*)	20	55	40	5	—	—
	Poulton and Watt (*e*)	61	60·6	29·5	9·8	—	—

Remarks.—(*a*) Includes 4 not traced and 36 post-operative. (*b*) Not all deaths due to Graves's disease. (*c*) Duration not given of fatal cases. (*d*) Duration 2½ to 8 years. (*e*) Class 3 includes 3 doubtful cases.

ADDENDUM

Forty additional cases have been treated between July, 1931, and July, 1933. It is too early to assess permanent results, but they show:—

In 22 cases marked improvement = 55 per cent.
„ 14 „ definite „ = 35 „ „
„ 4 „ no change = 10 „ „

This list includes one patient with a history of severe symptoms for 30 months who had lost 5 st. in weight and had severe cardiac symptoms and was for months continuously under digitalis. She improved rapidly but her doctor reported her death some 13 months later. He stated that the toxic symptoms had completely disappeared, but that she died of angina associated with jaundice.

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[*] A patient with a history of chronic phthisis, marked cardiac complications, and severe toxic symptoms was treated in August, 1933. She was reported to have died about two months later and it was stated that the treatment had had no effect in arresting the progress of the disease.

VAPORISED IODINE WITH BIER'S MODIFIED HYPERÆMIA

IN TREATMENT OF PYOGENIC CUTANEOUS AFFECTIONS

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Bier's modified artificial hyperæmia and the germicidal powers of iodine, conjointly used, are proposed as a local treatment for the follicular pyodermias and for the more obstinate non-follicular pyogenic infections. The rationale of these procedures may be briefly stated as follows.

Bier's Modified Artificial Hyperæmia.[1]—Normally the task of the blood is to circulate through the tissues of the body and to maintain therein the various physiologic functions. In Bier's conception, the phenomena of inflammation represent the effort of the circulatory blood to resist the harmful invasion of the body by disease. The redness and swelling of inflammation result from the increased activity of the circulatory blood and the exudation of serum—measures adopted to neutralise the harmful effects of the causative agent as well as to increase the nutrition of the involved structures in the hour of danger. Necrosis in its various forms means that the human structure has been incapable of coping with the particular disease; while disappearance of the inflammatory phenomena means the completion of the victorious fight of the stimulated blood current. The aim of Bier's artificial hyperæmia is to increase and fortify the normal beneficent inflammatory hyperæmia of the body in its time of need.

Bactericidal Properties of Iodine.—Iodine in the form of a tincture has enjoyed and is enjoying a unique favourable position as a cutaneous antiseptic. Simmons,[2] using modern bactericidal investigative methods, studied the effects of alcoholic solutions of iodine (both half and full strength tincture) upon certain bacteria, both in vitro and in actual skin disinfection experiments. The pathogenic bacteria used were: *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus scarlatinæ*, *Escherichia coli*, *Clostridium welchii* (spores), and *Bacillus anthracis* (spores). Simmons summarised the results of his laboratory studies as follows:—

1. The bactericidal efficiency, in vitro, of 3·5 per cent. alcoholic iodine solution was greater than the various mercurochrome solutions tested. Full strength iodine tincture was more efficient than the half strength.
2. Iodine gauze placed on the inoculated surfaces of nutrient or blood agar culture of the test organisms resulted in larger areas of growth inhibition as compared with the mercurochrome gauze.
3. In disinfection experiments on normal rabbit skin inoculated with cultures of the test organisms, iodine in 3·5 per cent. strength killed the organisms in and on the skin in 22 out of 42 tests, and in the other 20 the number of viable germs was greatly reduced.
4. Previous tincture of iodine application protected white mice against *B. anthracis* spores inoculated subcutaneously.

The latest contribution by Simmons[3] on the bactericidal superiority of iodine consisted of observations of its effect on skin abrasions, superficial incisions, and deep incisions, contaminated with undiluted broth cultures of either the *Staphylococcus aureus* or the *Streptococcus pyogenes* for various periods of time. Application of tincture of iodine to 151 wounds contaminated with staphylococci resulted in the following percentage of sterile cultures: abrasions, 83·4 per cent.; superficial incisions, 83·1 per cent.; and deep incisions, 31·2 per cent. The use of the tincture of iodine on 59 wounds contaminated with streptococci yielded the following results: abrasions, 75 per cent. sterilised; superficial incisions, 80 per cent.; and deep incisions, 82 per cent.

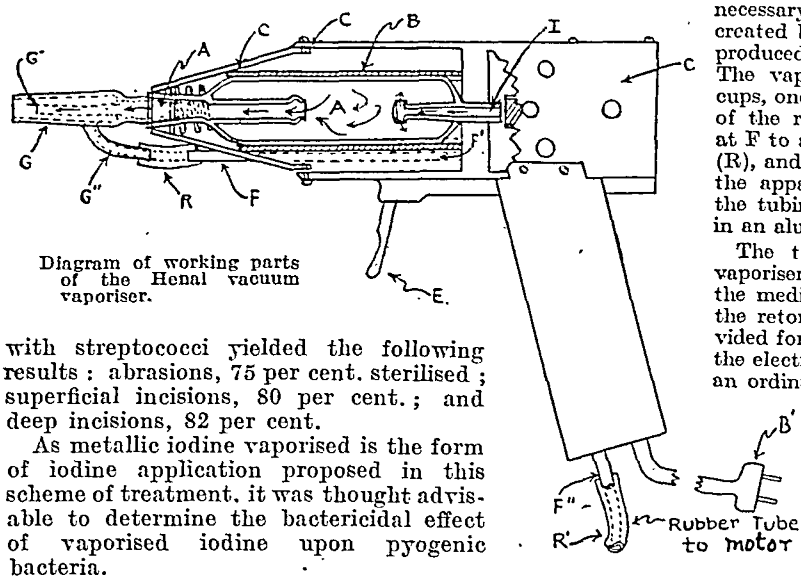


Diagram of working parts of the Henal vacuum vaporiser.

As metallic iodine vaporised is the form of iodine application proposed in this scheme of treatment, it was thought advisable to determine the bactericidal effect of vaporised iodine upon pyogenic bacteria.

The organisms used were cultures of the *Staphylococcus aureus* and of the *Streptococcus hæmolyticus*. The plan followed in these experiments was similar to that employed for the determination of the fungicidal properties of iodine. Filtered plain broth cultures of these cocci 24 hours old and of various strengths were enclosed in collodion sacs and suspended in the Strickler-Borneman apparatus,[4] and the vaporised iodine was delivered by the Henal vacuum vaporiser.[5] Six shots and a vacuum of 15 inches was the routine procedure, and each culture was kept in the iodine atmosphere for one hour prior to incubation. The cultures were observed for ten days, then subcultured by placing 1 c.cm. of the contents into a flask containing 100 c.cm. of Harmone broth. (This is an infusion beef medium made by a process in which digestion takes place in the ice-box.) Inhibition tests were done on each culture. Presence of iodine on the inside surface of the sacs as well as in the enclosed fluid cultures was determined routinally by the starch test. A control culture was used with each group of experiments.

A résumé of the bactericidal results is given in the accompanying Table.

Iodine Bactericidal Experiments using the Strickler-Borneman Apparatus and the Henal Vacuum Vaporiser

Culture dilution (per cent.).	Incubation period (days).	No. of expts.	(*a*) Results. (*b*) Control results.	(*c*) Time exposure to iodine vapour. (*d*) Presence of iodine vapour in culture fluid and in sac.	(*e*) Results of subculture. (*f*) Results of inhibition tests.
			Staphylococcus aureus		
2·5	10	2	(*a*) No growth. (*b*) Growth 24 hrs.	(*c*) 1 hour. (*d*) Starch test positive for both.	(*e*) No growth. (*f*) Growth present.
5		3			
10		2			
20		1			
50		1			
100		2			
			Streptococcus hæmolyticus		
5	10	1	(*a*) ditto (*b*) ditto	(*c*) ditto (*d*) ditto	(*e*) ditto (*f*) ditto
10		1			
20		1			
50		1			
100		2			

Note.—It is most important to place considerable powdered metallic iodine in the retort of the Henal Vacuum Vaporiser so as to obtain quite a heavy iodine vapour.

THE HENAL VACUUM VAPORISER

Description.—The essential parts of the apparatus are a Pyrex retort (see Diagram, A) enclosed in an electrical unit (B) designed to produce the exact temperature necessary to generate the vapour. Vacuum is created by an electrical motor apparatus and the produced vacuum is transmitted to the skin. The vapour is carried through special vacuum cups, one of which is shown inserted in the throat of the retort (A). The apparatus is connected at F to a vacuum line by means of a rubber tube (R), and the vacuum thus created passes through the apparatus through channels F' and F" and the tubing R'. The entire apparatus is enclosed in an aluminium casing.

The technique of using the Henal vacuum vaporiser is as follows. A measured amount of the medicinal powdered substance is poured into the retort through a glass funnel especially provided for that purpose. The electric cord, part of the electric heating system, is connected either to an ordinary light circuit or to a circuit included in the motor vacuum apparatus, and about ten minutes are allowed for the attainment of a maximum efficiency heat. The vacuum motor pump is then started. The mouth of the vacuum cup (G) is placed against the skin, and the air inlet (I) is closed by pressing the trigger (E). Vacuum is thus produced by the instrument and with it the desired hyperæmic condition of that area of the skin is covered by the mouth of the cup. On releasing the trigger (E) the air inlet (I) is opened and the atmospheric pressure drives the vapour from the retort channel (A) through the directing tube (G) and against the treated area. This procedure can be repeated on the same area as often as desired. Cups varying in design have been found best suited for treatment of various surfaces, as satisfactory creation of the vacuum depends on the snugness with which the cups are applied to the surface of the skin. It is most important to avoid air pockets between the margin of the cup and the surface of the skin. A set of five cups has been devised and found ample for treatment of any cutaneous surface.

In attaching the suction cup (G), the grinding is first slipped into the throat of the retort (A). Care should be exercised not to use too much force, for if the cup becomes jammed considerable difficulty will be experienced when it is desirable to change the cups. Each of these cups has a slim tube (G") which connects with a piece of rubber tubing (R). The other end of the rubber tubing (R) is connected to a slim tube (F) that is part of the vacuum system. It is necessary to exercise a little care when connecting G" to R. When the apparatus becomes too hot it is urgent to disconnect the current for a few minutes, and then restore the circuit. The presence of an excessive amount of crystalline substance on the skin indicates that there is too great heat, but lack of vapour shows insufficient heat. The apparatus may be refilled at any time, but when it is recharged while hot it is best to rotate the instrument for a few minutes to ensure even distribution of the powder in the retort.

Care of the Apparatus.—After giving a number of treatments the operator will notice that the rubber tubing connecting the pump with the instrument has lost its softness and elasticity. This is due to a coating on the inside of the rubber tubing, the result of condensation of excess vapour drawn toward the pump. If this process is permitted to continue, it will eventually close the tube and prevent the production of a vacuum within the applied suction cup. It is necessary from time to time to renew the rubber tubing. In order to lengthen the life of this tubing and keep the air channels clear, it is necessary to rinse or clean the instrument once daily, provided a large number of treatments have been given.

The rinsing or cleaning is done by connecting a small section of rubber tubing (about 12 inches (30·48 cm.)) to the front part of the instrument at R. The open end of this tube is submerged in a cup of alcohol. The trigger (E) is pulled back, as when a vacuum is being created.

This will draw the alcohol through the instrument and down through the vacuum tube. To conserve the amount of alcohol used it is suggested simply to dip the tube into the alcohol for a few seconds and then withdraw it. This is repeated a few times. A small amount of alcohol going through at intervals tends to dissolve the deposit within the rubber tubing more efficiently. After the alcohol, lukewarm water is used in the same manner for the last rinsing. The 12-inch rubber tubing is then removed. It is used only for cleansing the instrument.

The same condensation that takes place within the lumen of the rubber tubing also forms in the interior of the suction cups, but it is even heavier, owing to the fact that the applicators are of lower temperature than the vapour. It is absolutely essential to cleanse the cups after every treatment, and after every application when exudate of pus or serum is present and finds its way into the cup. When serum, pus, blood, or epithelial debris clings to the applicating cup it must first be removed with cotton swabs saturated in water. The cup is then soaked in an alcohol bath, rinsed with warm water and allowed to dry. It is then again ready for use.

SCHEME OF TREATMENT

Carbunculosis.—In the treatment of carbunculosis the tissues about the border of the lesion, both the hyperæmic and the normal, are to be treated with the vacuum alone. The degree of vacuum should vary from 10 to 25 inches; the time of application, one-half to one minute to each area; the number of reapplications, two to four; and daily treatments at the start. The infected area is to receive vacuum applications of 15 to 20 inches plus the vaporised iodine. Two to three reapplications with time duration of 30 seconds each usually suffices. With the subsidence of the inflammatory symptoms the vacuum treatments about the lesions are discontinued, and more intensive application of the vaporised iodine and vacuum made to the central necrotic area. With the removal of the necrotic "core" this treatment is stopped, and either metaphen solution 1:2500 or a 3 per cent. aqueous solution of gentian-violet is applied.

The following history typifies the events in the treatment of a case of carbunculosis by this method.

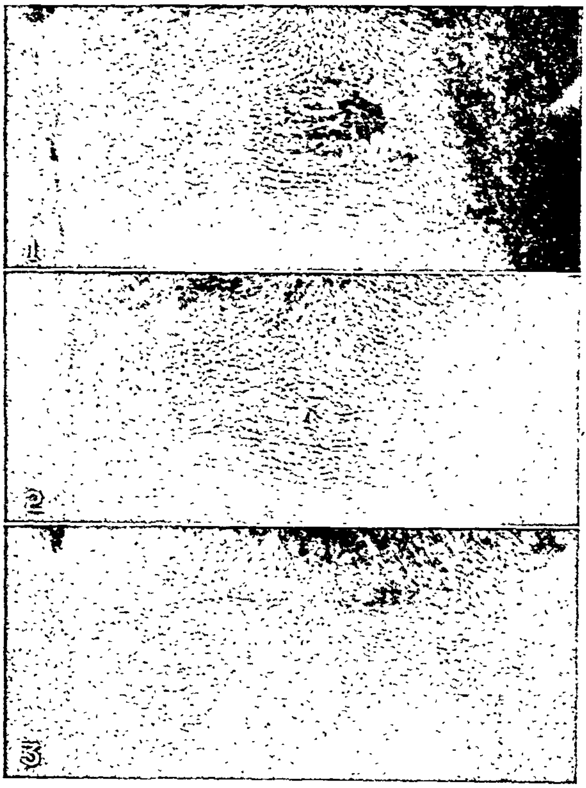
History.—W. A. B., aged 58 years. Admitted to the Skin and Cancer Hospital of Philadelphia with carbunculosis of the neck. Duration: four weeks prior to admission. When condition first began patient noticed a small furuncle on the back of the neck, accompanied by pain, chills, and fever. The lesion was incised, but did not improve. The inflammatory area began to involve the entire neck and constitutional symptoms became more pronounced. During these four weeks various established antiseptic applications were applied locally.

Condition on Admission.—A large, swollen, elevated, inflammatory mass was present on the back of the neck, measuring 5 in. × 4 in. The centre was necrotic, pus oozed from multiple openings, and the surrounding tissues were tender, indurated, and dusky red. The posterior cervical glands were enlarged. The pain in the back of the neck was quite severe and the patient complained of chills and fever. Temperature was 100° F.; pulse-rate, 120; respirations, 22. Nothing abnormal was found in the urine. A blood count showed moderate leucocytosis (11,000). There was no hyperglycæmia (blood-sugar 88 mg. per 100 c.cm.). Culture of pus showed *Staphylococcus aureus*. Medical examination was negative. Blood pressure, 126/65.

Treatment.—Vacuum treatment begun on day of admission (Nov. 28th, 1933). Daily treatment given, and by Dec. 1st, after three treatments, all discomfort disappeared. Drainage of the multiple openings continued until Dec. 12th, and by the 24th the wound was completely healed.

Very large furuncles are treated by the same technique as that suggested for carbuncles.

Furunculosis.—A furuncle seen early usually yields to one treatment to the lesion of two applications of vaporised iodine with a vacuum of 15 inches. Advanced furuncles usually require three to five consecutive daily treatments of 15 to 25 inches, of vacuum with vaporised iodine, and two to four reapplications to each lesion. The cup used for treatment should be sufficiently large to include the lesion as well as a portion of the adjacent skin. It is advisable, prior to treatment, to remove the epiderm overlying the infected follicle, as this facilitates more certain penetration of the vaporised iodine.



CASE I.—The patient, a diabetic, had a blood-sugar of 210 mg. per 100 c.cm., and the carbuncle had been present for three weeks before the author's method of treatment was begun (1). Twenty treatments were given. (2) Shows the beginning of healing. (3) Shows healing complete.

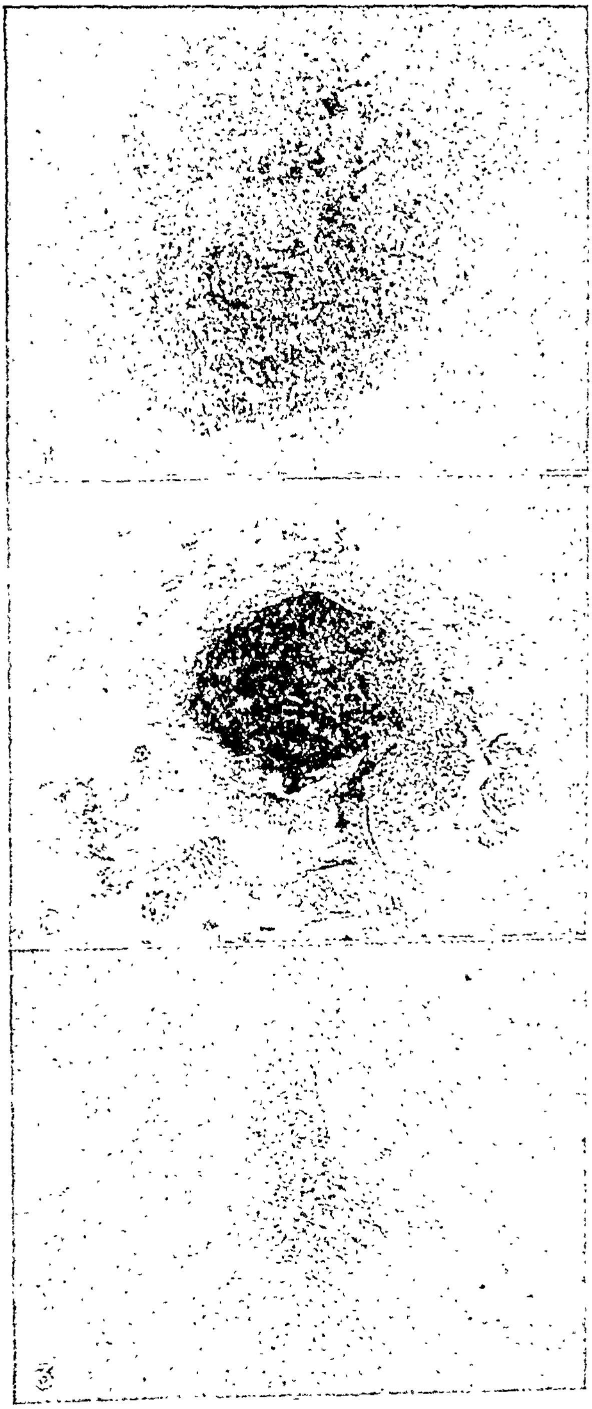
Abscesses.—This treatment has no direct favourable effect upon the course of an abscess. Its value lies in the necessity of only a small incision, for the vacuum will empty the pus contents and the vaporised iodine will antiseptise the cavity. No packing is required.

Non-follicular Pyodermias.—Such cutaneous affections as ecthyma, infectious eczematoid dermatitis, and dermatitis repens have been successfully treated by vaporised iodine and vacuum, provided constitutional factors are corrected if present. The affected part as well as the non-involved skin for a distance of several inches is to be included in the area of treatment. The vacuum recommended is from 10 to 15 inches to each area with three applications of the vacuum and of the vaporised iodine to each part of the affected skin. The time recommended for each application is from 10 to 20 seconds.

DISCUSSION

In advocating this method for carbunculosis it is important to weigh the advantages this procedure offers over other treatments—i.e., surgery and the X rays.

Surgery often calls for a general anæsthetic with its possibilities for dangerous complications, especially in subjects with severe vascular disease, advanced renal disease, or diabetes. There is also a small but definite surgical risk, necessity for skilful nursing, possibility of a long convalescence, and an unsightly scar. The value of X rays in carbunculosis depends upon the production of a mild hyperæmia. This treatment calls for the services of an expert and use of expensive apparatus, and perhaps, in the end, for surgical interference.



CASE II.—The patient, who had generalised lichen planus, developed a carbuncle over the lower dorsal vertebræ, and this reached 3 inches in diameter. (1) Shows the condition on Jan. 18th, 1933. He received 16 treatments up to Feb. 5th when healing began. (2) Shows *marked circumscription* of the lesion and the beginning of separation of necrotic material. (3) Shows healing completed.

The modified Bier's hyperæmia and vaporised iodine treatment is advocated both because of its logical experimental basis and the good results obtained. It has these advantages: simplicity of application with no special training required; absence of any risk; rapidity of relief from pain; speedy control of the septic phenomena when present; quick healing with but insignificant scarring. The aim of this treatment is to assist Nature in its effort to fight infection by increasing vascularity and favouring the interchange of blood in the congested area. Using iodine as the germicide, we are employing a remedy which clinically and in the laboratory has proven to be a dependable agent.

RÉSUMÉ OF CLINICAL RESULTS

Carbunculosis.—Fifteen patients with carbunculosis have been successfully treated by this method. The duration of the active treatment—i.e., up to beginning of healing—varied from 7 to 18 days. Constitutional evidences of septic absorption were not encountered. In some cases the pain subsided rapidly, and in others it was quite severe for a few days. Severity of the pain can be mitigated by warm metaphen (1 : 2500) application. The accompanying photographs illustrate the results of two patients with carbunculosis treated by this method.

Furunculosis.—Fifty patients with furunculosis have been successfully treated by this method. The inflammatory phenomena and the pain usually subside very rapidly. At times, however, the treatment appears to intensify the discomfort for a short while. Healing as a rule begins after three to five treatments. Dry dressings are used.

Non-follicular Pyodermias.—Six patients with obstinate infectious eczematoid dermatitis, two with ecthyma, and one with dermatitis repens were cured by this treatment.

At present we are treating a number of patients with rebellious sycosis vulgaris by the iodine and vacuum method. As a whole our results are not very encouraging. We are now planning to use X ray depilation of the affected area, and follow this by the vacuum vaporised iodine treatment. It seems logical that this method should succeed.

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PALMER MEMORIAL HOSPITAL, JARROW. — The closing of Palmer's shipyard and works has produced a critical situation for this hospital, the only one in the town. Its principal source of income has been the contributions from Messrs. Palmer's employees which for the last 11 years have averaged £1250 per year. This source of income has now ceased, and the hospital is in danger of being closed at the end of September. Should £500 be forthcoming the hospital could pay its way to the end of the year, which would allow time for the preparation of a scheme which, it is hoped, would enable it to go on. *Three-fourths* of the insured working in Jarrow are unemployed.

"CURIOUS BODIES" FOUND IN THE LUNGS OF COAL-WORKERS

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Three years ago Tylecote and Dunn[1] gave an account of a case in which bodies resembling the "curious bodies" of asbestosis were found in the lungs of a coal-miner who had never worked in asbestos. He had worked in the coal-mines of Alabama and Lancashire. The "bodies" described by them simulated asbestosis bodies in shape and size and also in their abundance of free iron. The authors presumed them to be minute fragments of some inhaled iron-containing material which had undergone a chemical change under the influence of the body fluids. W. E. Cooke[2] in 1932 reported a case of "curious bodies" similar to those found in asbestosis occurring in a Lancashire coal-miner. He suggested that the formation of the "bodies" depended on the presence of silica and altered hæmoglobin. Last year Gloyne[3] stated that he had found these "bodies" in coal-miners' lungs "and in anthracosis." He considered them to be minute particles of carbonaceous material which occasionally had a deposit of yellow pigment around them, and thought them to be of no significance.

This paper is based on the examination of lungs from 26 selected cases. I am indebted to Prof. J. B. Duguid and his staff of the Welsh National School of Medicine for the material. The lungs were obtained from autopsies on individuals who died at the Cardiff Royal Infirmary during a period of six months. The investigation was meant to be confined to coal-workers' lungs in the first place, but it was later considered necessary to include lungs from another type of person to act as controls. Sixteen of the coal-workers were miners and seven trimmers. Three "controls" were taken; two were women and one a salesman. The causes of death were various. In seven cases death was due to injuries. There was only one death attributed to silicosis with tuberculosis. In two others, both coal-trimmers, however, there was in certain parts of the lungs a marked degree of fibrosis which may have been a contributory factor to the cause of death.

1. The *technique* employed was similar to that described by Cooke.[4] Representative portions of lung were taken and cut into very small pieces. These were put into tap water which had been made alkaline with sodium carbonate. To each 10 c.cm. was added 1 c.cm. of liquor trypsinæ co. After digestion for three or four days at 37° C. the material was centrifuged. The deposit was washed with water and examined microscopically.

2. In some cases the following method was employed and found to be easy and very successful. Paraffin sections of the lungs were mounted on slides in the usual way. After treatment with xylol, alcohol, and water, each section was ringed with paraffin to anchor it. Several slides were immersed in an alkaline solution of trypsin and left in the incubator overnight. They were then washed with water carefully and the ring of paraffin removed with a needle. After drying thoroughly in an oven the sections were mounted in Canada balsam. On microscopical examination a network pattern of dust was seen in which "curious bodies" were easily found.

3. Blocks of lung were also fixed in formalin for routine histological examination.

MORPHOLOGY

Out of 26 lungs examined, "curious bodies" were found in eight, or 30 per cent. They were exceedingly constant in structure, consisting of a black, slender, rod-like core at the poles of which was a golden yellow deposit. The appearance was reminiscent of a collection of iron filings at the poles of a bar magnet. Sometimes there was also a pale yellow annulated encrustation around the core. Unlike the asbestosis bodies, they did not vary much in shape, nor did they appear to originate in granular amorphous material. They always had a spicule as their basic structure. A Prussian blue reaction for iron was given in every case by the golden yellow deposit at the poles of the body. The deposit failed to take any of the aniline dyes, but in some cases it stained black with hæmatoxylin. It stained a very deep yellow with iodine. When treated with 25 per cent. sulphuric acid, the core was left with a colourless faintly outlined ghost of the deposit. The "bodies" resisted prolonged trypsinisation. Neither the core nor the deposit was doubly refractile, although doubly refractile particles were frequently seen in the same lung debris.

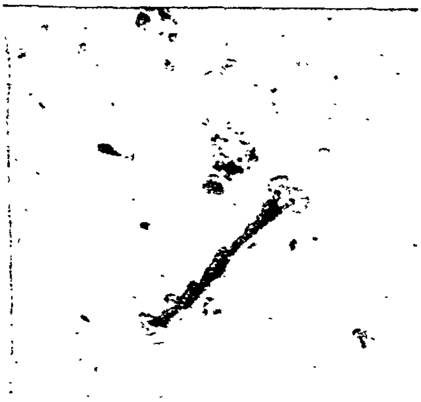

FIG. 1.—"Curious body" from a coal-miner's lung. (× 500.)

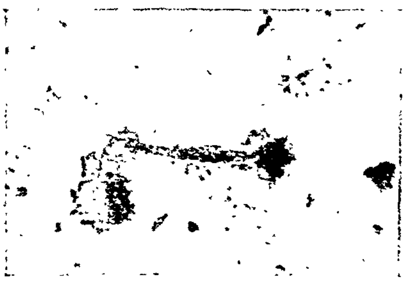

FIG. 2.—"Curious body" from a coal-trimmer's lung. (× 700.)

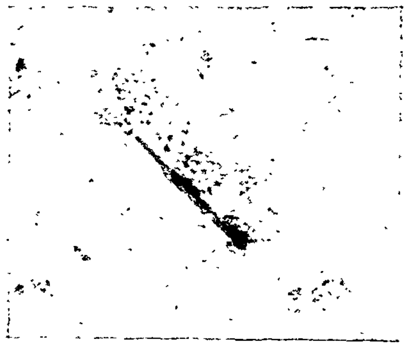

FIG. 3.—"Curious body" from the lung of a young woman. (× 400.)

Coal-miners' lungs.—Portions of lung from 16 miners were examined. It was difficult to obtain detailed "industrial histories" of these men. They had worked, with one exception, in the Eastern Glamorganshire coal-field. Fifteen were hewers and one a colliery mason whose work had been underground. They had all been exposed, therefore, to both coal dust and rock dust. In the strata of this coal-field sandstones and ironstones are found. The sandstones contain high proportions of silica. The average age of the men was 53. The youngest was 45 and the eldest 63. It is therefore probable that the length of service underground in all cases exceeded 30 years.

"Curious bodies" were found in five cases. They were present in very great numbers in one case, and were easily demonstrated in the lung sections. This patient had died of silicosis and tuberculosis, and had typical whorled fibrosis of his lungs. All the other lungs of this positive group showed various degrees of diffuse fibrosis, which was accompanied in one case by early nodulation. Doubly refractile particles were seen in the sections of three lungs. The histological findings in the 11 negative lungs were very similar to those of the positive group. Diffuse fibrosis, varying greatly in degree, was present in 10 lungs. In one case early nodulation was seen. There were doubly refractile particles in six sections.

Coal-trimmers' lungs.—Seven trimmers' lungs were examined. These men had trimmed coal at the Cardiff docks. Their average age was also 53, so that one can presume that their length of service was the same as the miners'. As far as could be ascertained, six of these men had been coal-trimmers for the whole of their industrial lives. One, however, had been a miner for five years before becoming a trimmer, at which occupation he had worked for 30 years. With the exception of this man, the trimmers had been exposed, presumably, to coal dust alone. Coal which is loaded and trimmed for export is usually "washed" free of extraneous dusts before it is delivered to the dockside.

"Curious bodies" were found in two cases. In one case they were even more numerous than in the miner who died of silicosis. They were abundant in the histological sections, lying among the coal dust deposits and in areas of fibrosis. In the other the "bodies" were few but were quite typical. Both these lungs showed almost no fibrosis. Two of the negative trimmers' lungs showed much diffuse fibrosis. Both men had died after a long period of dyspnœa and had been bedridden for many months before death. There was no evidence of active tuberculosis in either case. In one of these cases portions of lung were submitted to chemical analysis. In two blocks of lung, selected as specially hard and black, 11·9 per cent. and 4·8 per cent. of silica was found in the ash. There was practically no fibrosis in the sections from the other three negative cases. Although large deposits of coal dust in peribronchial and perivascular lymphatics were a feature of all the trimmers' sections, doubly refractile particles were not seen in any instance.

"*Control*" *lungs.*—Two of the three control lungs gave negative results. In the third, the lungs of a young woman, one "curious body" resembling, though possibly not identical with, those found in the coal-workers' lungs was seen after examining several slides. The lung debris contained many spicules which appeared to be mineral dust. There was no trace of fibrosis in the lung sections, but there were small deposits of coal dust, such as one would expect to find in the lungs of a woman who had lived in a narrow colliery valley where the atmosphere is laden with dust from the coal screens.

DISCUSSION

In this paper the term "silico-anthracosis bodies" has been avoided because it appears to me that no connexion with silico-anthracosis as a disease has been established. From the data reviewed here it appears that the presence or absence of "curious bodies" is of no help in establishing a diagnosis of the disease. It is true that a large number of "curious bodies" were present in the lungs of the only miner who died of silicosis. They were, however, still more numerous in the case of the coal-trimmer whose lungs showed practically no fibrosis. There was a marked degree of fibrosis and a large amount of dust in the lungs of two other trimmers, yet no "curious bodies" were found in these cases even after repeated examinations. It is difficult to assign significance to these "bodies" until more is known of their structure.

In this series of coal-workers were trimmers who had been exposed exclusively to coal dust and miners who had worked in coal and rock mixtures. "Curious bodies" were found in both groups. There was nothing to suggest from the mere finding of the bodies that one of these dusts was responsible for their formation. They were found in lungs which showed much fibrosis and in lungs where there was none; in miners' lung sections where doubly refractile particles were present and in trimmers' lungs where no bi-refringent particles were seen. It has been suggested that these "curious bodies" are formed by the adsorption of disintegrated blood substances by spicules of silica or particles of carbon. Another view is that they are due to the chemical interaction of an iron-containing mineral with the tissue fluids.

So far it has been impossible to obtain the "curious bodies" in sufficient numbers to investigate them minutely. It would be useful to identify the spicule by a petrological method such as measuring its refractive index. The deposit at the poles of the body may be a manifestation of some type of "crystal growth" such as is often seen in some siliceous minerals.[5] Quite often the deposit is arranged in a radiating fashion which suggests a phenomenon of this kind. Whatever may be the constitution of the "curious body" it appears that a gross pathological condition of the lungs is not necessarily present in cases where they are found.

SUMMARY

Portions of lung from 26 cases were digested with trypsin and the deposit examined microscopically. "Curious bodies" were found in eight cases. They were found in lungs from five of 16 miners, two of 7 trimmers, and one of 3 controls. From evidence collected in this investigation, it appears that gross pathological lesions of the lungs need not be present where "curious bodies" are found, hence it is difficult to ascribe any significance to their presence.

I am greatly indebted to Prof. S. Lyle Cummins for his help and encouragement during this investigation, to Prof. Duguid for the autopsy material and for allowing the microphotographs to be made in his department. A grant from the Medical Research Council greatly facilitated the research.

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CLINICAL AND LABORATORY NOTES

THE NATURE OF HENRY'S REACTION IN MALARIA

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In 1928 A. F. X. Henry described a new serological test for the diagnosis of malaria, depending on the property of malarial serum to flocculate a solution of melanin pigment. This he called melano-flocculation. The nature of this reaction has still to be determined. Although various suggestions have been put forward no satisfactory explanation has been given.

Henry (1934) favours the view that the reaction occurs as the result of interaction between melanin pigment acting as "antigen" and a corresponding antimelanin-agglutinin developed in human sera after malarial infection. Chorine and Gillier (1933), however, have suggested that the reaction is due to an increase in the serum globulins accompanied by a disequilibrium in the other soluble constituents of the serum. They have shown that negative sera can be transformed to positive sera by the addition of four volumes of 1/2000 formalised distilled water, that positive sera become negative when heated at 55° C. for half an hour, and that the melanin pigment used for the test proved to be non-antigenic by animal immunisation.

Greig, van Rooyen, and Hendry (1934) favour the latter view, since by a number of experiments they found the reacting principle in positive serum to be thermolabile at the relatively low temperature of 55° C., and that melanin pigment failed to produce an agglutinin response after repeated inoculation in rabbits. Consequently they consider that the phenomenon cannot be regarded as a true flocculation following interaction between antigen and antibody and suggest the term melano-precipitation is more correct than melano-flocculation. They also refuted the idea that the reaction might be due to some other substance or substances which happen to be present in colloidal solutions obtained from hair in the preparation of the solution used, by demonstrating that dioxyphenylalanine, the natural precursor of melanin, also gives a positive reaction.

Chorine and Gillier (1933) have further suggested that the reaction is due in part or in whole to an increase in the blood of such substances as lecithin, cholesterol, and uric acid, but it has been shown by Fairley and Bromfield that in malaria there is, if any change, a hypocholesterolæmia and a slight increase in the blood-urea. Thus the reaction cannot be considered as due to an increase of cholesterol, and it still remains to be proved that the increase of blood-urea is in any way related to the cause of the reaction. Greig, van Rooyen, and Hendry have come to the conclusion that phospholipoids are intimately bound up with the melano-precipitation reaction, and have published graphs to show how any rise in the titre is accompanied simultaneously with a fall in the lipoid phosphorus and vice versa, at the same time proving that the reaction is not due to an increase in lecithins.

Recently I have been investigating the value of the melano-precipitation test in cases of malaria, following strictly the improved technique introduced by Greig, van Rooyen, and Hendry. While the investigation was in progress it was noticed in estimating blood-urea that when 0·2 c.cm. of serum were added to 2·0 c.cm. of distilled water precipitation frequently occurred. A mental note was made of the degree of turbidity produced, and this was later found to correspond with the reaction obtained in the melano-precipitation tests. Consequently it was decided to run a parallel series of controls containing serum and distilled water only, the melanin solution being excluded, and it has been found that under these conditions exactly similar precipitates are found, except that the precipitate in the controls is white while that in the original tubes is brownish in colour owing to the presence of the melanin solution. In fact, on occasions the reaction in the water control has been positive in higher titre than in the melanin tubes; further, in one or two instances where cases have had parasites in the blood, the melanin tubes have been negative while the water controls have been quite strongly positive. Finally, so far in the investigation, every case which has given a positive result in the melanin tubes has done so in the controls with distilled water. These facts are exemplified by the accompanying Table of cases selected from the series.

Case No.	Parasites.	M.P.R.	Titre.	W.C.	Titre.	Remarks.
1	B.T.	+	1/16	+	1/32	—
2	B.T.	+	1/32	+	1/64	W.R. + +
3	B.T.	—	—	+	1/8	—
4	B.T.	+	1/16	+	1/128	—
5	B.T.	—	—	—	—	—
6	B.T.	—	—	+	1/8	—
7	S.T.	+	1/16	+	1/8	—
8	S.T.	—	—	+	1/128	Saline control also negative.
9	S.T.	+	1/4	+	1/128	—
10	Nil	—	—	—	—	Blackwater fever. Rigor 105°.
11	Nil	—	—	+	1/16	Chronic malaria. After treatment with atebrin M.P.R. —ve. W.C. 1/128.
12	Nil	—	—	+	1/8	Chronic malaria. Last rigor nine days before admission.
13	Nil	—	—	+	1/32	M.T. malaria when in S. Africa and in Ceylon. Returned to England 4½ years ago.

M.P.R. = Melano-precipitation reaction; W.C. = water control; B.T. = benign tertian; S.T. = subtertian; M.T. = malignant tertian.

On further reviewing what has been written on Henry's test it was discovered that previous workers, employing the original technique, had already noted that the reaction sometimes occurred with distilled water alone. This flocculation with serum and distilled water Henry calls "surflocculance." Trensz (1932^a) considered the difference between this and the flocculation in the melanin tubes to be a matter of degree only, Henry's reagent assisting the flocculation. He injected 11 guinea-pigs with trypanosomes (*T. berberum*) and the reaction became positive soon after the appearance of trypanosomes, and as the reaction became stronger "surflocculance" occurred in six of the control tubes. Chorine (1933), on the other hand, does not agree with Trensz that they are the same phenomenon. From observations in the present preliminary investigation I have formed the opinion that these phenomena are one and the same, the melanin merely adding a brown colour to the flocculation; and it appears that the reagent tends if anything to hinder the reaction, but whether it does so as a result of its pH factor, chloride, or other salt content has not been determined. In this connexion it is interesting to note that in Case 8 where parasites were present in the blood the melanin tubes were negative, the water controls were positive 1/128, and when the serum was put up with normal saline only a negative result was obtained. This suggests that the salt content of the solution in itself tends to inhibit the reaction. Thus, while we are at a loss to account for the true nature of the reaction, it would appear from the observations here made that the precipitate is in all probability a globulin. Furthermore, the pigment produced in malaria has been identified as hæmozoin (Wats and White, 1932) and so it is difficult to understand why melanin should have anything to do with the reaction. In view of these findings it is considered that the melanin employed in the test since its inception plays no real part in the reaction and since it is difficult to prepare could be abandoned. Finally, the terms melanoflocculation and melano-precipitation would appear to be misnomers.

The investigation has been carried out in the Hospital for Tropical Diseases, London. I am grateful to Dr. G. Carmichael Low, Dr. Philip Manson-Bahr, and Dr. N. Hamilton Fairley for permission to use their cases, to Mr. R. J. Bromfield for valuable aid in the laboratory, and I am deeply indebted to Lieut.-Colonel E. D. W. Greig, Dr. C. E. van Rooyen, and Mr. E. B. Hendry, of Edinburgh University and Edinburgh Royal Infirmary, for so kindly furnishing all the melanin solution used in the tests, and to Dr. van Rooyen for demonstrating the test to me.

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CARCINOMA OF THE ŒSOPHAGUS WITH FISTULA INTO THE AIR-PASSAGES

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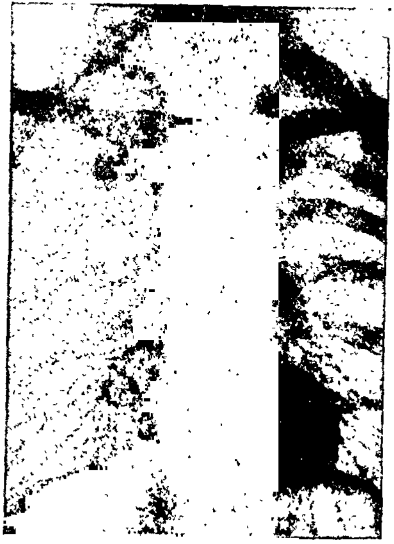
A MAN, aged 59, was first seen on Oct. 16th, 1933, complaining of difficulty in swallowing. Eight months previously he had felt "the throat getting fuller" and for the past three months it had become difficult to swallow; he developed a cough and there was regurgitation of food with coughing, in attacks which were often severe during and immediately after a meal. He described himself as otherwise "as fit as ever," and, being a professional tramp, had walked 20 miles a day for some previous days.

On examination of the nose, throat, and larynx nothing abnormal was discovered except some frothy mucus in both pyriform fossæ. Cervical and axillary glands were not palpable. At the X ray examination by Mr. Ulysses Williams the thin barium emulsion produced a spasm of coughing, and during deglutition it was difficult to follow the barium on the screen. Immediately afterwards it was seen that the barium was passing through a fistula just below the cricoid and that the bronchial tree was clearly outlined (see Figure).

Œsophagoscopy revealed a large ulcer extending across the anterior wall of the œsophagus with the upper edge situated 1½ in. below the cricoid cartilage. The surrounding œsophageal wall was infiltrated and a small piece of tissue was taken from the edge of the ulcer for section. Bronchoscopy revealed a swelling on the posterior tracheal wall about 2-2½ in. below the cords. The posterior wall could not be seen completely beyond the swelling, but a dimple was visible with a drop of blood-stained fluid by it. A section of the edge of the ulcer confirmed a diagnosis of carcinoma of the œsophagus.



Radiogram taken after the patient had swallowed barium emulsion. It has passed through the fistula and into the bronchial tree on both sides.

A gastrostomy was performed by Mr. L. E. C. Norbury on Nov. 8th, and the patient declared himself, and appeared, fit when he was transferred to a L.C.C. hospital on Nov. 22nd. The cough was very much improved. He lived for four months after the diagnosis was first made, and was free from any cough or regurgitation, and indeed of any symptoms referable to his respiratory or alimentary tract. During these four months he became increasingly cachectic and gradually went downhill and died on Feb. 19th, 1934. A postmortem examination could not be obtained.

There were found to be three other similar cases in the hospital records for the past ten years, and a summary of the case notes is given below. There are one or two interesting points. It will be observed that they were all diagnosed by X ray examinations, though on careful questioning a history could be obtained from them which indicates the presence of a fistula in addition to the œsophageal obstruction. In two cases it appeared that some of the food swallowed was regurgitated with coughing. In another there was a history of being frightened to swallow. The fourth merely complained of a cough which produced a great deal of sputum and that this had had a definite and marked commencement unassociated with any illness.

CASE 2.—Male, aged 59. Admitted Oct. 18th, 1926. Three months ago: lump in throat, difficulty in swallowing. Two months ago: pain on swallowing. Five weeks ago: vomits and coughs after meals; wasting rapidly. Cough for one year, much worse last three months. On radiography barium emulsion runs down to the level of the bifurcation, where there is a distinct check. Then some emulsion passes on into the lower part of the œsophagus and stomach, but a large quantity is seen passing into each bronchus. There is a stricture of the œsophagus at the level of the bifurcation of the trachea due to a neoplasm. Also broncho-œsophagoscopy shows a fistula. No treatment was carried out, and the patient died in St. Luke's Hospital on Nov. 27th, 1926.

CASE 3.—Female, aged 46. Admitted July 10th, 1927. Eleven months ago: hoarseness and difficulty in swallowing. Six months ago: worse. For past two to three months: wasted rapidly and "any food taken" was coughed back again. Radiography (Oct. 5th): post-cricoid growth, fistula between trachea and œsophagus; bronchi outlined by barium emulsion. Oct. 11th: gastrostomy. Oct. 13th: died.

CASE 4.—Male, aged 65. Admitted August 5th, 1930. Six weeks ago: first symptoms of difficulty in swallowing solids. Two weeks ago: cough and sputum—no pain on swallowing, but frightened to swallow owing to choking. Radiography (lipiodol): extensive obstruction half-way down œsophagus with ? fistula communication into left bronchus. Broncho-pneumonia left lower lobe. Gastrostomy was performed on August 8th, and the patient died on the 10th. At autopsy the œsophagus showed an ulcerated growth at the level of the bifurcation of the trachea communicating with left bronchus. There was broncho-pneumonia of the left lung.

In any case of carcinoma of the œsophagus in which "cough," "sputum," and "bronchitis" are prominent symptoms, and particularly when these symptoms are aggravated by taking food, a fistula should be suspected. The apparent good health of the patient will be misleading, so long as it is generally thought (and the statement still appears in many text-books) that such a perforation is associated with a rapid onset of broncho-pneumonia and death.

It is seen from these cases that the fistula had probably existed for from two weeks to three months before the patient reported to hospital. In Case 2 the patient lived for five weeks after the diagnosis was definitely made, having probably perforated five weeks previously. There was no treatment. In the first case here reported the patient lived for four months after the diagnosis was made, a gastrostomy having been performed, but there seems little doubt that the fistula was present for seven months in all before the patient's death.

BACILLARY DYSENTERY DUE TO FLEXNER, TYPE "Z"

PRESENTING SOME UNUSUAL FEATURES

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The patient was admitted to hospital at Masjid-i-Sulaiman under one of us (S. D. M.) with diarrhœa and pyrexia of 12 days' duration. The attack began with mild shivering and tenesmus; later there was abdominal discomfort and vomiting, and then diarrhœa. The temperature rose to 101° F. The diarrhœa gradually increased in intensity until she was passing some 12 or more stools a day. At no time did she notice blood or mucus in her motions. She continued to have loose motions until admission, with occasional bouts of mild abdominal pain and discomfort, which were associated with mild pyrexia and marked anorexia. About two days before admission she developed mild gingivitis with two aphthous ulcers on the upper gums between the incisor teeth. Her menstrual periods were regular.

On admission pulse-rate 88, temperature 99·4° F., general condition good, no loss of weight, tongue furred, marked generalised hyperæmia of gums, two ulcers on upper gums. Some injection of throat, tonsils not enlarged. No abnormal signs in chest. No enlargement or abnormal signs in heart; pulse rapid, well-marked sinus arrhythmia. Abdomen: generalised discomfort, no marked tenderness at any one place but diffuse slight tenderness. Sigmoid flexure palpable and slightly thickened. Stools only two der day.

Treatment.—At first she was given Bovril, strained soup, weak Horlick's and weak milk and soda, with sodium sulphate grs. 10 four-hourly. On the following day the sodium sulphate was increased to grs. 20 four-hourly; her temperature rose to 98·8° in the afternoon but she had no pain or discomfort. Next day she felt much better; and on the next her diet was increased to fish, eggs, and milk puddings, and the sodium sulphate was reduced. Next day there was considerable improvement and a soft normal-looking stool. She was given a diet scheme and discharged from hospital to have the vaccine in out-patients.

Pathological Investigations.—The patient's blood was examined for malarial parasites with negative results. A differential count showed: polymorphonuclears 50 per cent., lymphocytes 35 per cent., eosinophils 2 per cent., large mononuclears 3 per cent., no abnormal red cells. The urine was negative. The first stool examined was green, watery, and contained a little mucus and *Entamœba coli.* There were no pus, blood, or epithelial cells, no *Entamœba histolytica* or cysts, no ova. Cultured on McConkey's medium, about 12 pearly-white, irregularly margined colonies were seen, 1 mm. across at their broadest point and centrally clear—not granular. Three were picked off and produced acid but no gas, in the butt only, of three tubes of Russell's triple sugar medium. Taken further, acid, no gas, was produced in glucose, and mannite broth; there was slight indol production in peptone broth; motility was absent; gelatin not liquefied, and there was no change in litmus milk. A 24-hour broth culture put up with Burroughs and Wellcome's anti-B. Flexner serum, No. B.6921.M., titre 1/1600 and incubated four hours, half immersed, in a water bath at 56° C. in Dreyer tubes, was agglutinated at 1/100 but not in the higher dilutions. Later 24-hour broth cultures were put up with Medical Research Council standard agglutinating sera, as under:—

Dilution ..	1/25.	1/50.	1/125.	1/250.	Control.
Type V ..	0	0	0	0	0
,, W ..	0	0	0	0	0
,, X ..	T	T	T	0	0
,, Y ..	T	T	S	0	0
,, Z ..	T	T	T	S	0

Explanation of symbol: T = total; S = standard; tr = trace.

The incubation was for four hours at 56° C. in Dreyer tubes; the titre of the sera was 1/250 and they were dated Oct. 3rd, 1933.

The patient's serum was put up with Medical Research Council standard agglutinable cultures, with the same technique as for the standard sera, the results being:—

Dilution ..	1/25.	1/50.	1/125.	1/250.	Control.
Type V ..	S	tr	0	0	0
,, W ..	0	0	0	0	0
,, X ..	T	T	0	0	0
,, Y ..	T	T	tr	0	0
,, Z ..	T	T	S	0	0
Mrs. W ..	T	T	T	0	0

It was considered unnecessary to proceed with absorption agglutination experiments; it seemed quite definite that the type "Z" antigen was the predominant one in the bacillus.

Successive stools for about ten days were cultured on McConkey; the number of non-lactose-fermenters on the plates progressively declined during the first three days and then disappeared altogether, the remaining seven stools all being negative.

An autogenous vaccine was made and the patient was treated with a full course in order to prevent a relapse. A remarkable feature of this illness was the consistently diarrhœic stool; at no time was the classic picture of blood, pus, mucus, and epithelial cells presented by the stools. Another point was the ease with which dysentery bacilli were isolated from the motions, in comparison with the difficulty of growing the responsible micro-organisms from a typical mass of "pink jelly" of which the great majority of stools from cases of bacillary dysentery are composed. It is possible that the masses of mucus, in these classic examples, actually have an anti-bacterial effect, as demonstrated recently by Prof. Howard Florey, and the result is that the pathogenic organisms are so affected that they are unable to proliferate on a McConkey plate.

We have to thank Dr. E. Jamieson, chief medical officer, Anglo-Persian Oil Co., Ltd., for permission to publish this paper.

REVIEWS AND NOTICES OF BOOKS

Industrial Maladies

By Sir THOMAS LEGGE, C.B.E., M.D. Oxon., D.P.H. Camb., late H.M. Senior Medical Inspector of Factories and Medical Adviser to the Trades Union Congress. London: Humphrey Milford, Oxford University Press. 1934. Pp. 234. 12*s*. 6*d*.

IT was in 1898 that Legge was appointed first medical inspector of factories. In the early part of his career at the Home Office he was chiefly engaged in studying and dealing with the prevention of occupational lead poisoning—and with this disease his name will always be associated. He subsequently worked on anthrax, tetanus, industrial cancer of the skin, toxic jaundice, and poisoning by arsenic, phosphorus, mercury, and the bichromates. It is difficult to find an industrial disease on which he could not speak with authority and experience. He resigned his Home Office appointment in 1926, but was afforded an opportunity of continuing to some extent his life's work when he was made medical adviser to the Trades Union Congress in 1929. Lady Legge explains in the dedication to the book that the author, knowing that his death might befall before the book was ready for press, left directions that Dr. S. A. Henry of the Home Office should be asked to edit it, and this has been arranged.

The first two chapters deal with notification of industrial disease and industrial poisoning and compensation for industrial diseases. The history of the subject is revealed, and the four axioms for which Legge is now well known are laid down:

> (1) Unless and until the employer has done everything—and everything means a good deal—the workman can do next to nothing to protect himself, although he is naturally willing enough to do his share.
>
> (2) If you can bring an influence to bear external to the workman (i.e., one over which he can exercise no control) you will be successful; and if you cannot or do not, you will never be wholly successful.
>
> (3) Practically all industrial lead poisoning is due to the inhalation of dust and fumes; and if you stop their inhalation you will stop the poisoning.
>
> (4) All workmen should be told something of the danger of the material with which they come into contact, and not be left to find it out for themselves—sometimes at the cost of their lives.

Subsequent chapters deal with anthrax, tetanus, and poisoning by lead, phosphorus, mercury, and arsenic. Details are given of industrial processes and methods used in minimising the risks of poisoning. Figures are constantly quoted in tabular form, showing the effects of legislation in reducing the case-incidence from year to year. The subject matter is quite up to date, extensive references being given to new work, such as that of the Harvard workers on lead poisoning, of the Queensland workers on chronic nephritis amongst young people, and of geologists on sericite in quartz. Poisoning by benzene, nitro compounds, carbon bisulphide, carbon tetrachloride, dinitrophenol, and methyl alcohol follow. Separate chapters are devoted to poisoning by fumes and gases, industrial dermatitis, industrial cancer of the skin, and industrial pneumonoconiosis. Tables and figures of the incidence of the various types of poisoning are provided throughout the book, and emphasis is everywhere placed upon the type of protective measure found effective in the industrial process concerned.

In one respect the book could be improved, and that is the choice of illustrations. The pictures of industrial cancer are excellent and to the point, but industrial argyria is profusely illustrated though it has quite disappeared in industry. The picture of the dust cloud from stripping the cylinder of a cotton carding engine suggests that a spinning mule, a grinding shop, and radiograms of the chest in pneumonoconiosis could usefully be added. Illustrations of the methods used in preventing disease in industry would be more instructive to the student than tables and charts showing the incidence of industrial disease at various times, and we should like to see pictures of exhaust ventilation applied in a lead works, of a rock-drill provided with a water-jet, and of a vacuum apparatus in use to clean a carding machine in an asbestos works.

This is a book which should be in the hands of every medical man engaged in the health inspection of factory workers, but it is also a book for the general practitioner, by whom most cases are first seen, and who should have sufficient knowledge of industrial conditions to understand how his patients may become ill as a result of the occupation they follow. To-day 37 occupational diseases are scheduled as compensatable by various Acts of Parliament.

The work is a monument to a man who was not only a pioneer in the prevention of disease in industry, but who was probably the greatest authority on this subject of our times.

Die Postoperativen Pneumopathien

By Prof. C. HENSCHEN. Basel: Benno Schwabe and Co. 1934. Pp. 177. Fr.8 (Swiss).

THIS monograph is in the main a survey of the world's literature on post-operative pulmonary complications. Statistics from the well-known surgical clinic in Basle, and short accounts of the author's views, experiments, and practice are interspersed, but no concise statement of essentials emerges. A vast number of writings have been abstracted, condensed, arranged, and to a certain extent discussed, with painstaking care and thoroughness; the gist of them all is there for the inquirer to consult and judge. It is an excellent example of the agglomerative review. But in this subject, as in many others, most readers would be grateful for that rarer species, the synthetic review, a coherent presentation of what, in the reviewer's judgment, and in the light of his experience, is most valuable in the writings of his predecessors. This monograph will be very useful to the specialist making an intensive study of the subject, but the surgeon or the anæsthetist seeking help in the reduction of post-operative morbidity will have difficulty in seeing the wood for the trees.

Nature and Nurture

By LANCELOT HOGBEN, M.A., D.Sc., Professor of Biology in the University of London. London: Williams and Norgate Ltd. Pp. 143. 6*s.* 6*d.*

THIS book consists of the William Withering memorial lectures delivered at Birmingham last year under the title of "The Methods of Clinical Genetics." It contains little that the author has not previously discussed in his book "Genetic Principles in Medicine and Social Science"; but the essential arguments are here presented in simpler language and are less burdened with higher mathematics. Since his appointment to the chair of social biology in the University of London, Prof. Hogben has in two main ways contributed to the study of how genetic principles might be applied towards the prevention of disease. In the first place, he has drawn attention to the fact that, if adequate statistics could be collected of the familial incidence of certain commoner diseases and defects and of the occurrence of consanguineous marriages among the ancestors of sufferers from them, it might be found that many more than are at present recognised are the product of recessive genes. His influence in stimulating research in this subject is now making itself felt in appropriate quarters.

In the second place, Prof. Hogben's attitude to clinical genetics is avowedly influenced by his dislike of eugenists. In an earlier book he went so far as to advocate the substitution of the term "genetic therapy" for the word "eugenics" on the ground that "the term 'eugenics' has become identified with ancestor worship, anti-semitism, colour prejudice, anti-feminism, snobbery and obstruction to educational progress." Discussing in this book the ambiguities of the word "intelligence" he says, "Dean Inge may describe a social policy as intelligent. In that case, the writer would probably describe it as unintelligent." Now eugenists stress the importance of the rôle of heredity in the causation of human excellencies and infirmities. In many instances they doubtless over-stress it, minimising in the process the importance of the environment. One of the tasks which Prof. Hogben has set himself in this book is to emphasise the possible rôle of the environment. He points out that certain abnormalities in the fruit fly of unquestionably genetic origin, which affect the shape of the abdomen and the number of facets in the eye, largely depend for their appearance on environmental conditions such as moisture and temperature. Unlike the fruit fly, however, human beings begin their lives in an intimate environment, the vicissitudes of which may easily affect them—namely, the uterus. As an example of the possible effects of an abnormal uterine environment, he selects mongolian idiocy—not an entirely happy choice. The genetical statistician, Prof. R. A. Fisher, is especially singled out for attack: working in the rarefied atmosphere of higher mathematics, he is held capable of ignoring completely such trivialities as imperfections of diagnosis and unsuspected defects of environment. The general conclusion is that hereditary human abnormalities are very interesting to investigate, but that our efforts to eliminate them by genetic methods are premature in that we may at any moment learn how to cure them by bringing about changes in the environment. Prof. Hogben quotes Ostwald: "Among scientific articles there are to be found not a few wherein the logic and mathematics are faultless but which are, for all that, worthless because the assumptions and hypotheses upon which the faultless logic and mathematics rest do not conform to actuality."

The combined effect of these two attitudes of the author is somewhat disconcerting. If this book happened to be read by a busy house physician or hospital registrar who had been asked (for no remuneration) to undertake a comprehensive and difficult inquiry into the incidence of consanguineous marriages in the ancestors of all patients suffering from (say) acute nephritis, he might be pardoned for asking what purpose was to be served if the chief promoter of the inquiry regarded it, from the preventive standpoint largely, from the therapeutic standpoint wholly, academic. The answer that the results would be genetically interesting would hardly seem to justify his labours.

A Synopsis of Hygiene

Fourth edition. By W. W. JAMESON, M.A., M.D., F.R.C.P., D.P.H., of the Middle Temple, Barrister-at-Law, Professor of Public Health, London University, and Director of Public Health Division, London School of Hygiene and Tropical Medicine; and G. S. PARKINSON, M.R.C.S., D.P.H., Lieut.-Colonel R.A.M.C. (ret.), Assistant Director of Public Health Division, London School of Hygiene and Tropical Medicine. London: J. and A. Churchill. 1934. Pp. 619. 21*s.*

THIS standard text-book on public health appears in a somewhat changed form. While retaining its attractive features—excellence of style, abundance of references to recent writings, adequacy of treatment—the order in which the various subjects are treated has been totally changed. Thus ventilation, heating, lighting, atmospheric pollution, water-supplies, sewage, housing, sanitary law—matters which form the special province of the sanitary inspector—although fully dealt with are relegated to the end of the book. Public health administration and vital statistics are presented to the student in the first chapter, the latter being particularly well handled. There is much to be said for the rearrangement; the bias in public health has moved away from environmental hygiene and writers of text-books should take cognisance of the fact. The prevention of disease cannot be discussed without reference to statistics.

The book is thoroughly reliable, and gives to each aspect of the various subjects just the right amount of emphasis. We can recommend it without reservation.

A Short History of Some Common Diseases

Edited by W. R. BETT, M.R.C.S., L.R.C.P. London: Humphrey Milford, Oxford University Press. 1934. Pp. 211. 10*s.* 6*d.*

THIS small book contains a series of essays by well-known writers, who have attempted, some with greater success than others, to summarise in a few pages the history of common and prominent diseases. The articles are not written in accordance with any definite pattern, the authors sometimes confining themselves chiefly to a record, with dates, of particular work done by prominent men, while other writers pay particular attention to ancient history, and others to modifications and developments of treatment. As certain of the chapters have very full references to the authorities upon which the writers are relying, the book will serve as a guide to deeper reading. Some of the essays appear scrappy, and all sixteen are not of equal merit, but it is clear that to tell the story in a few pages of (say) tuberculosis, venereal diseases, endocrine disorders, and heart disease is a difficult task and for the most part the authors may be congratulated on their efforts.

The Atom

By JOHN TUTIN, D.Sc. (Durham). London: Longmans, Green and Co. 1934. 6*s*.

IN this book of little more than 100 pages the author challenges acceptance of the Rutherford-Bohr atomic model. We do not think that the challenge is as serious as it is sincere, for the simple reason that there is very little quantitative backing for the claims that are made for this new atom. Briefly, the author seeks to turn the Rutherford-Bohr atom inside out. Instead of the mass being concentrated about its centre as a nucleus, rather is it collected on the periphery, and he then goes on to explain how many phenomena would, in his opinion, receive a much more rational explanation from his model than from the one which has such general scientific acceptance to-day. It may be that, in stating his claims, the author is confusing the rôle of the atom with that of the molecule. One of the essential duties of an atomic model is to provide a rational mechanism for the emission of radiation, and year by year the spectroscopists become more and more impressed with the potentialities of the Rutherford-Bohr atom in this respect. It would be idle to put forward as a competitor an atom which can do none of these things, whatever other phenomena the new model may explain.

British Journal of Children's Diseases

THE July-September issue (Vol. XXXI.) contain the following papers. The Story of Tracheotomy by Dr. E. W. Goodall: brings up to date the histor of this operation. Dr. Goodall has collected 2 examples of successful tracheotomy during the perio of 2000 years up to the time of Bretonneau, the firs having been performed by Asclepiades, who wa born in the second century B.C. Apart from thre cases recorded by Caron in 1766, Andrée in 1782 and Chevalier in 1814, all the successful operation were on adults. The paper will be continued in subsequent issue.—In An Analysis of Over Fou Thousand Cases of Educational Deafness Studie During the Past Twenty-five Years, Mr. Macleo Yearsley records the results of his experience a consulting aural surgeon to the London County Council. The cases are grouped under the heading of congenital and acquired deafness, the forme (with which the present instalment of Mr. Yearsley' study is concerned) being subdivided into hereditary and sporadic cases, and congenital aphasia.—Dr P. D. Davydoff, of the North Caucasus State Institut for the Protection of Maternity and Childhood contributes a paper on Helminthiasis in Children in which he records his experience of the condition in Soviet Russia, where it appears to be unusually prevalent and serious.—In a paper on Nocturna Enuresis, Dr. C. J. C. Earl discusses the incidence causation, psychological explanations, and treatment of bed-wetting from his experience at the London Child Guidance Clinic.—Some Pædiatric Eponyms: (VI.) Eustace Smith's Sign is the title of a paper by Dr. W. R. Bett, who gives an intimate sketch of this well-known pædiatrician, illustrated by his portrait and autograph. The abstracts are devoted to cardiovascular diseases.

NEW INVENTIONS

AN ANGLE-PIECE FOR MAGILL ENDOTRACHEAL TUBES

AS Dr. Magill[1] has pointed out, endotracheal anæsthesia by means of a single rubber tube is more satisfactory if there is no leakage of gases between the tube and the glottis, and he recommends packing off the pharynx with gauze to prevent this leakage. When using gas-oxygen-ether anæsthesia for abdominal surgery it is even more important to prevent this leakage, and a number of anæsthetists have found that this can equally well be achieved by passing an endotracheal tube by the nasal route, replacing the facepiece of the gas machine, and securing it on the patient's face with a Clausen's harness. This obviates the necessity for packing, and is a much simpler procedure than is necessitated by passing the inflatable intratracheal cuff of Guedel and Waters.[2] It is a method which can be used for all operations below the level of the mandible, and whose only contra-indications are when there has been bleeding from the nose on intubation or when the pharynx is full of secretions.

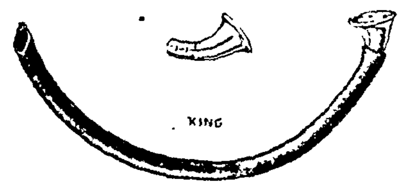
There are, however, three objections to the use of any of the existing patterns of angle-piece for this purpose:—

(1) When the facepiece is removed at the end of the anæsthetic a Magill or Challis or Rowbotham pattern angle-piece is often found to have bruised the upper lip or the nose.

(2) There is a tendency for any of these models to touch the sides or cushions of the facepiece and thus obstruct the free airway.

(3) Not infrequently some of the lubricating vaseline works its way between the tube and the angle-piece, and the latter becomes disconnected. In such a case the tube can quite easily slip down the nose, and may have to be recovered with a pair of forceps.

To obviate these difficulties I have devised a small metal funnel, shown in the accompanying photograph, whose narrow end fits into the tube. This end is provided with knocked-up teeth which take a firm grip of the inside of the tube. The middle of the stem is curved at an angle of about 200°, so that it fits the curve of the nasal fossa, while the wide end is rounded off and presents no sharp edges which can bruise the face.



Since this method is chiefly useful in adults I use two sizes of these connexions: the smaller to fit a No. 6 Magill tube, and the larger a No. 9. To ensure an adequate airway the minimum internal bore should never be less than 3/16 in. These end-pieces are large enough to admit of the passage of the cleaning-brush, and are intended to be left in place during cleaning and boiling throughout the "life" of the tube.

This method, as Magill[1] and Tovell[3] have pointed out, is equally useful with a Schimmelbusch mask if open ether is being administered, but the tube is less liable to become obstructed by the gamgee or other face-pads if this type of angle-piece is used. It is made by A. Charles King, of 34, Devonshire-street, W.1.

London Hospital, E. N. A. GILLESPIE, B.M.

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[1] Magill, I. W.: Proc. Roy. Soc. Med., 1928, xxii., 83.

[2] Guedel, A. E., and Waters, R. M.: Ann. of Otol., Rhinol., and Laryngol., 1931, xl., 1139.

[3] Tovell, R. M.: Anæsth. and Analges., 1931, x., 97.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 8, 1934

THE WORLD WE LIVE IN

Any common man who hears or reads Sir James Jeans's presidential address this week to the British Association at Aberdeen may be excused if he feels a little bewildered. Is this, he may well ask, the physicist's most up-to-date summary of the most exact of sciences, or is it Alice in Wonderland, or is it someone in a dark room looking for a black cat which isn't there ? Something perhaps of all three, but probably mostly a demonstration of the scientific philosopher at his best, groping about for an explanation of the results of observation and experiment which he knows by revelation to be there but which he cannot clearly grasp, still less define and make available for others. Sir James's address might have been written by a religious mystic who was not quite sure what particular gospel he ought to preach. Theoretical physics, he says, is concerned with appearances rather than reality, and it has two lots of appearances. In the one the world is made up of particles which exist in time and space. In the other it is composed of a system of waves, or perhaps more nearly as a system of waviness for which ordinary space and time provide no adequate background; it may need six dimensions of space, and as there is no justification for identifying any particular three of these with those of ordinary space the wave picture comes to lie entirely outside space and is purely a construction of our minds. Experiment and mathematics are all on the side of the wave structure and yet the particles cannot be abandoned, for they represent the grains or units which pervade the whole of nature from the indivisible quantum of energy to the indivisible live organism.

The physicist's trouble is that no one has yet had the luck or cunning to hit on the idea which will bring together these two interpretations into one and provide an explanation of the universe as a consistent whole. Sir James does not doubt that such a synthesis is possible, but he goes on to point out that it may be expected to come from ourselves rather than from outside. The old physics thought that it was studying something which had an objective existence of its own—and most of us still so think of the world. But the new physics—if indeed it still be physics—holds that the nature we study does not consist so much of something we perceive but of our perceptions. In the old physics the student's mind was a spectator, in the new it is an actor; the perceiver and the perceived are interacting parts of a single system, and no clear distinction can now be drawn between mind and matter. If this is so, and if nature consists of our own mental constructions, how is it that we all make the same constructions and see the same moons and the same mountains ? It is not, we think, quite certain that we do; myopes and the colour blind suggest that there may be a good deal more variability than is apparent. But assuming a general uniformity, Sir James proposes an attractive explanation. Physically, he points out, the wave explanation takes no notice of individual particles, and innumerable photons come together as a beam of light, electrons as an electric current, and cells into a live organism.

If this is true of the objects perceived it may be equally valid for the perceiving minds. In space and time we are obviously distinct individuals; beyond these limitations we may be the components of a continuous stream of life. And so once again the mathematician comes round to the biological point of view, and now he is no less of a mystic. But Sir James is no biologist, else surely he would not have repeated Sir James Ewing's gloomy misconception, emitted at the Yale meeting two years ago, that man's control over nature has outstripped his moral control over himself. No naturalist could believe that, nor is it consonant with the plain experiences of life, and we could wish that Sir James Jeans had not felt in duty bound to come back to earth at the end of a noble sermon.

TUBERCULOSIS AMONG NURSES

> 304. The fear of infection is difficult to combat, though reports of infection with tuberculosis of the nursing staff of sanatoriums are so rare as to be negligible. Since tuberculosis is notifiable, statistics bearing on this aspect of recruitment should not be difficult to collect, and their publication might help to convince parents that their daughters are no more liable to contract tuberculosis than they would be in any other branch of nursing.

This paragraph from the final report (1932) of The Lancet Commission on Nursing deals quite frankly with a matter of public interest. The risk of infection taken by nurses whose duties bring them into contact with tuberculous patients must always exercise the minds of those responsible for training. So far however no very clear leading as to the prevalence of the infection has been forthcoming. Dr. J. A. Myers, Dr. H. S. Diehl, and Dr. H. D. Lees[1] have recently explored the question from a new angle by comparing three nursing schools in the United States, one having a tuberculosis service of 30 beds amongst its nursing duties, the others having tuberculous patients to nurse from time to time but having no definite tuberculosis service. Judged by the standard of tuberculin tests of probationers followed through to their final year of training, school 1 with the nursing service comes off very badly. The positive reactors in this school increased from 40 to 100 per cent., whereas in school 2 the reactors remained more or less stationary and in school 3 only increased from 25 to 45 per cent. The authors have no doubts as to the significance of these positive reactions. They say "the hospitals that have infected for the first time or reinfected their students [i.e., nurses] have committed a serious offense against them. A good many of these girls will suffer from clinical tuberculosis as the decades pass, and some of them will die from that disease." This is hard hitting, but the authors support their views with the fact that more than 11 per cent. of the nurses starting negative to tuberculin in 1929 are already suffering from clinical disease. At the same time this particular school is perhaps not to be regarded as typical but rather to be held up as a warning to thoughtless administrators. J. Heimbeck's[2] figures for Oslo, so often quoted, show that out of 282 nurses who began their training with a positive Pirquet reaction, 1·4 per cent. subsequently developed tuberculosis, whilst of 299 with a negative reaction 22 per cent. developed the disease.

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[1] Jour. Amer. Med. Assoc., June 12th, p. 2086.

In dealing with the number of actual breakdowns from tuberculosis amongst nurses we are on safer ground than with the positive reactors. In this country figures were long ago published showing the proportion of resident medical officers, dispensers, nursing staff, female servants, and porters at Brompton and Victoria Park hospitals who contracted tubercle. The results were regarded as highly reassuring, but it must be borne in mind that diagnosis before the discovery of the tubercle bacillus was not very precise. In Germany, following upon Cornet's work on transmission of bacilli by dust, a hospital inquiry was instituted by the Prussian Minister concerned, with the result that a high mortality amongst the Catholic nursing orders was revealed. In 1910 J. E. Squire, in a paper read before the Royal Society of Medicine, collected the data then available; of 234 nurses who had worked at Ventnor and Crooksbury 3 (or 1·2 per cent.) were then known to have had a breakdown. After the war the subject was approached again, and in a more systematic manner, both in Europe and America. For the six-year period 1918–1923 O. Scheel found[3] that among 2913 nurses in Norwegian communal hospitals there were 30 cases of pulmonary tuberculosis (including miliary), 27 of pleurisy, 3 of renal, and 3 of osseous tuberculosis, making a total of 63 (or 2·2 per cent.). In this record the incidence of pleurisy was greatest in the first year of the nurse's service, and of other forms in the third year. One of the most thorough investigations[4] is that of E. L. Ross for Canadian hospitals. A preliminary inquiry had shown in 1926 that out of 1514 women treated in a group of Canadian sanatoria 99 were nurses. Ross compiled a record of 60 tuberculous nurses; he found that 40 had broken down during training and 20 afterwards, 10 of the latter within one year and 5 within three years—that is to say, of 800 nurses trained during a four-year period in the province of Manitoba approximately 6 per cent. became sanatorium patients directly from their training schools or within a year of completing their training. These 60 nurses came from 20 different hospitals; only rarely did a sanatorium nurse break down with tuberculosis. In America J. A. Britton and Bollman (quoted by E. K. Geer) found 2·2 per cent. of all nurses employed in Chicago had tuberculosis, S. J. Shipman and E. A. Davis 2·6 per cent. in the University of California training school over a period of six years, and Geer himself 5·5 per cent. in St. Paul, Minnesota (but only 1·6 per cent. in a later series). An inquiry in a New Zealand hospital by D. W. Carmalt Jones[5] and a committee of the hospital staff shows an incidence of 3 per cent. per annum during two years, all cases being pulmonary tuberculosis. In Germany H. Much (quoted by Geer) found the incidence in the Eppendorf Hospital up to 1918 was 1 per cent.; after the war it rose to 4·6.

As far as we are aware no recent figures are available for this country with the exception of a brief record[6] of nurses under the Welsh National Memorial Association published in 1926—11 tuberculous breakdowns in 996 nurses (1·1 per cent.). It would appear however that the incidence of clinical tuberculosis amongst nurses generally ranges between 1 and 6 per cent. While that may be true—as well as vague—we cannot draw deductions until we know the incidence of tuberculosis amongst the young adult female population in the districts from which probationer nurses are drawn. Very few of the writers on the subject have attempted this; those who have (e.g., Carmalt Jones) suggest that the figures for nurses may not be in excess of their non-nursing similars—in other words, tuberculosis amongst nurses is part of the general problem of the undue prevalence of tuberculosis amongst young adult females. This is the first point for further investigation. Some of the records quoted are compiled for the years of training only, others include follow-up records for various periods after the completion of training. It is obvious that the nurse is exposed to special risks, but the old danger from the diminution of resistance by excessive fatigue is now less frequent, while food and sleeping accommodation are usually better than in former days. Against this must be set the fact that nowadays nurses begin their training early in life. Ross noted that the breakdowns appeared to have no special relationship to any particular part of hospital work, though there was a general impression amongst the nurses themselves that night duty had had an unfavourable effect. Sanatoria have as good a record as general hospitals, indeed, in some cases better; probably because, as Ross pointed out, undiagnosed cases of infective tuberculosis are more common in the latter, whilst an open-air régime is the rule in the former. Fortunately, in the case of the nurse early diagnosis is generally assured. Ross noted that as many as 38 of his 60 cases had been diagnosed within two months of developing symptoms, a much better record than that of young adult female patients in general. The prognosis therefore is also better.

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[2] Norsk mag. f. laegevidensk., 1929, xc., 18.
[3] Tidsskr. f. d. Norske laegef., 1924, xliv., 709.
[4] Canadian Med. Assoc. Jour., 1930 xxii., 347.
[5] Arch. Internal Med., 1932, xlix., 77; and Amer. Rev. Tuberc., 1934, xxix., 88; Tubercle, 1933, xv., 59.
[6] Tubercle, 1926, vii., 334.

The practical issues are various. Two of these are seen in the questions: Should young women with a family history of tuberculosis be accepted as nursing probationers? Should ex-tuberculous patients be offered posts? Some sanatoria are prepared to accept the risk of a further breakdown, whilst general hospitals in most cases definitely decline to take the risk. The presence of obsolete tubercle in nurse applicants who have never had an actual breakdown raises an issue closely related to that of HEIMBECK's tuberculin-positive nurse. Is it better for a nurse to have a positive tuberculin or a negative reaction on starting training? C. J. JACOBSON[7] in recording 5·2 per cent. of Danish nurses with tuberculosis was unable to satisfy himself on this point. A positive reaction before training generally means obsolescent tubercle; a positive reaction acquired during training is more likely to signify active disease. X ray records should prove more valuable than tuberculin tests in the decision. We shall not get far until many hospitals compile records of their nurses, including a follow-up inquiry, and pool their experience.

THE CAUSATION OF SQUINT

WHAT is the primary cause of concomitant internal squint? DONDERS taught that it is hypermetropia, resulting in a want of balance between the linked reflexes of accommodation and convergence. The theory is sound so far as it goes, and the prescribing of spectacles is, and will doubtless remain, an essential preliminary to treatment in all applicable cases. Many cases, however, occur in emmetropes or quite low hypermetropes and, in general, when an internal squint is associated with hypermetropia the extent of the former by no means shows the correspondence with the degree of the latter that the theory demands. A second well-established cause is a defect in the power of fusing the images which fall upon the retinæ of the two eyes. In 1903 Mr. CLAUD WORTH published an important book in which he maintained that this is the essential condition applicable to all cases. By inventing the amblyoscope he laid the foundation for the modern orthoptic treatment of squint, and though 20 years later at a meeting of the Ophthalmological Society he admitted[8] that the proportion of cases in which fusion training is applicable is much smaller than he at first thought, we may agree with him that in suitable cases and at the right age this treatment yields results which could not have been obtained by any other means. Most of the surgeons who spoke at this meeting agreed about the theoretical value of the amblyoscope, but for practical purposes used it merely as a means of diagnosis. Since then many new instruments have been invented for training the sense of fusion, and some of them are in daily use at the orthoptic training clinics of ophthalmic hospitals. For an estimate of the value of these devices on the one hand, and of the practical limitations of their usefulness on the other, our readers will be grateful to Mr. L. H. SAVIN, whose postgraduate lecture appears at the front of our present issue.

Although it is probably true as maintained by WORTH that all cases of concomitant squint are accompanied by a defective development of the fusion sense, yet it is open to question whether he was correct in maintaining that this is the essential cause in all cases. Speaking at the discussion in 1921, already referred to, Mr. BISHOP HARMAN maintained that the most important determining cause was defective muscle balance. He cited some cases of extreme esophoria continuing into adult life without causing squint, and suggested that the reason why these cases are so rare is that most of them are lost in the all-obscuring condition of manifest squint. Heredity is an important factor in many cases, and examples more or less similar to Mr. SAVIN's curious case of congenital squint in twins will be within the experience of many ophthalmic surgeons. Finally, as Dr. W. S. INMAN has so often insisted, the psychological element must not be ignored. Squint often varies with the emotional state of the child, especially about the time of onset, and may even disappear spontaneously. Miss M. A. PUGH, who has had considerable experience at the Moorfields clinic for the orthoptic training of squint, has gone into the causation in 500 cases.[9] Of these, refractive error was the primary factor in 62 per cent., defects in the fusion sense in 15 per cent., psychological factors were predominant in 21 per cent., the remaining 2 per cent. being put down to physical defects. Miss PUGH further subdivides the 103 psychological cases thus. Imitative squint 7 per cent.—in one pair of brothers both squinted, the elder one had a large refractive error and the younger one was emmetropic. The younger one squinted a week after the elder one. Jealousy squint 10 per cent.—a frequent cause is the advent of a new baby; the elder child will mope and be unhappy and will suddenly squint. The wish seems to be to bring the focus of attention back to the patient. Fear or shock squint 26 per cent. —as when a child was frightened at night by a drunken father and woke up on the following morning with a marked and constant squint. In these ways nearly half the cases in this group are accounted for. The remainder occurred in children who were either themselves "difficult" or whose home surroundings were unfavourable. It may be doubted whether it is really possible to say what is the primary cause of squint in the great majority of cases, but among the causative factors the psychological cannot safely be neglected.

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[7] Hospitalstid., 1933, lxxvi., 763.

[8] Trans. Ophth. Soc., 1921, xli., 181.

[9] Brit. Jour. Ophth., August, 1934, p. 446.

OUR ELDERS AND BETTERS

A letter lately appeared in the *Times* suggesting that the medical profession is unduly severe on patients over seventy. The writer, himself a doctor, took the view that after this age response to treatment is poor and habits are already moderate, so that insistence on a strict régime may, to no purpose, make life not worth living. He got scant thanks, however, for this humane thought; one septuagenarian reader sent an answer which implied that he, at all events, is willing to try anything once; and a surgeon was provoked to declare that he had found two classes of patients almost immune from the perils of surgical attack—namely, Quakers and those over 80. The fact is that the old will stand a good deal more than we usually give them credit for. Dr. F. W. Bailey,[1] of St. Louis, points out that as people tend to lead quieter, and therefore (he considers) more normal, lives as they grow old, they become less subject to such ills of youth as acute appendicitis, ruptured duodenal ulcer, acute pancreatitis, acute cholecystitis, and specific bloodstream infections. On the other hand, they are exposed to greater danger from circulatory and renal changes, enlarged prostate, malignant degeneration, fibrosis, and fatty degeneration, and unfortunately there are plenty of occasions on which acute surgical emergencies are superimposed upon degenerative changes, and timely surgery becomes desirable. As a rule, however, the patient is serenely ready to chance it, like the old lady with acute obstruction whose case is described by Dr. H. C. Colman on page 576. The aim, in such a case, is not to rejuvenate the patient but to return him to his normal senile state. "When surgery is necessary in the very aged," Dr. Bailey says, "prolonged bed rest, sudden change of environment and diet and an abrupt curtailment of previous habits which are not directly inimical to their illness, should be avoided and the maintenance of an agreeable psychic atmosphere encouraged." He thinks that in all serious cases a pre-operative transfusion of blood should be given, or, where that is impossible, intravenous glucose. Serious ailments should never be allowed to develop beyond the margin of safety, and minor ailments should not be left untreated merely because the patient is old. He finds that patients are more grateful, on the whole, for the relief of a minor painful disability than for successful treatment of something more serious. This is worth bearing in mind, for the old have as much right to be comfortable as the young.

If the aged offer few terrors to their surgeon they usually expect to find a good listener in their physician. He can always retaliate, however, by putting the patient on a diet, and that outlined by Dr. Robert Hutchison in the "old age" number of the *British Journal of Physical Medicine*,[2] though plain to the point of grimness, has probably helped many an antique digestion to work smoothly. He recommends, for breakfast, dry toast and butter, a lightly cooked egg or a little white fish, and one cup of tea or coffee; for the midday meal, two courses only, fish and meat, fish and a sweet, or meat and a sweet—the sweet to be milk pudding, baked custard, junket, or stewed fruit. For tea there is one cupful of weak tea and no solid food; and this is followed by a light evening meal of white fish and a potato, or bread and milk, or a boiled egg, and at bedtime a cup of soup or Benger's food, or a little whisky and water and a biscuit. Happily Dr. Hutchison adds that such a scheme must be used with elasticity. In some people "appetite and digestion remain unimpaired up to an advanced age and for such fortunate ones the ordinary diet of a healthy man is permissible though strict moderation should be exercised in its use."

There is no unison, of course, among the oracles in reply to the question: "When does old age set in?" One speaker, discussing Dr. Bailey's paper, maintained that a man was old when he gave up tennis and took to golf—a decision which many will contemplate with alarm. Dr. Bailey puts the limit, with liberal exceptions, at 60, Dr. Colman at 70; while Sir Humphry Rolleston, in his "Medical Aspects of Old Age," offers evidence in favour of the classical statement that the circulatory system, more often than any other part of the body, sets the upper limit of the human life span. But even the doctrine that a man is as old as his arteries has its pitfalls; the late A. P. Graves, the Irish poet, when he was forty visited his doctor, who alarmed him by saying: "Mr. Graves, you have the arteries of a man of eighty." He lived to be nearly a hundred, and somewhere in his eighties had the pleasure of hearing his doctor exclaim: "Mr. Graves. you have the arteries of a man of forty!"

IN MEMORY OF THEODORE WILLIAMS

Generous gifts for the advancement of medicine are made known in the will of the widow of Dr. Charles Theodore Williams, who died in July at the great age of 90 years. Theodore Williams, who was born in 1838 and died in 1912, was a student of Pembroke College, Oxford, and throughout his life remained a devoted son of Oxford. He founded four university and two college scholarships in human anatomy, physiology and pathology, including bacteriology in relation to medicine, and shortly before his death he was elected an honorary fellow of Pembroke. He was also in his lifetime a benefactor of the Royal College of Physicians of London, of which he became fellow in 1871, councillor in 1891, and censor in 1899. He gave £1000 to the endowment fund of the College and was instrumental in founding the Bisset Hawkins memorial medal. He was also for a time president of the Medical Society of London. The bequests now announced include £30,000 to Oxford University, to be expended by the faculty of medicine for the promotion of medical education; £5000 to the Royal College of Physicians, to be devoted to the exercise of hospitality and to the maintenance of its dignity; and £100 to the Medical Society of London. Mrs. Williams has also left to Pembroke College a portrait in oils of her husband, by Herbert Olivier, and the residue of her estate to promote its prosperity.

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[1] Amer. Jour. Surg., May, 1934, p. 487.

[2] Brit. Jour. Phys. Med., August, 1934. *Contributions on various aspects of old age* by Mr. F. W. Law, F.R.C.S., Dr. F. Talbot, L.D.S., Dr. Robert Hutchison, Mr. J. C. Ainsworth-Davis, F.R.C.S., Dr. W. Yeoman, and Dr. W. W. MacNaught.

ANNOTATIONS

AEROPLANES AS CARRIERS OF INFECTIOUS DISEASE

THE temporary failure of international coöperation in politics throws into relief the success of international coöperation in preventive medicine. Its latest achievement is the Sanitary Convention for Aerial Navigation,[1] now signed and ratified by most of the important countries of the world, notable exceptions being the South American republics and the Dutch East Indies. The Convention is comprehensive and adequate and provided that the High Contracting Parties carry out their work properly it should go far to allay the fears of the many hygienists who see great danger of infectious disease being spread by aeroplanes. Of its two parts the first contains some general provisions dealing with the establishment of "sanitary aerodromes" and other matters, while the second sets out regulations governing the "Big Five" diseases—plague, cholera, typhus, small-pox, and (with a special chapter to itself) yellow fever. It is left to the authorities of each country to decide whether "sanitary aerodromes" shall be established, but the attendance of a medical officer at all "authorised" aerodromes where required for the purposes of the Convention is obligatory. Sanitary aerodromes will have a staff of medical officers and sanitary inspectors, a place for medical inspection, equipment for the taking of pathological specimens, facilities for the isolation, transport, and care of the sick and of contacts, and apparatus for disinfection, disinsectisation, and deratisation where required. Aircraft will not be required to carry bills of health but facts of public health importance, which are to include the appearance of any of the Big Five in the area from which the aircraft has come, are to be entered in the journey log-book. Although any territory may if it thinks fit carry out sanitary measures on arrival of aircraft from an infected "local area," it is before departure that the special measures (inspection, disinfection, &c.) enjoined for plague, cholera, typhus, and small-pox must be taken. These follow the same lines as in the International Sanitary Convention of 1926, and it is chiefly in connexion with yellow fever that further stringent provisions are laid down.

The special dangers of yellow fever lie in the wide distribution of its mosquito vector, the highly infective nature of the virus, and the existence of large "silent" areas in which the native population has been infected. One such area was described in our last issue by Dr. T. F. Hewer, who showed that the disease has been or is endemic in a wide zone in the Anglo-Egyptian Sudan where its presence has been unsuspected. As the Imperial Airways route to the Cape runs through this area it is gratifying to learn that all the measures prescribed by the Convention are already in force there. They include a general provision that signatories shall "take the necessary steps to ascertain whether yellow fever exists in their territory in a form which, though not clinically recognisable, might be revealed by biological examination." In regions where yellow fever has occurred or exists in endemic form there shall be established "anti-amaryl aerodromes" which in addition to the equipment of a "sanitary aerodrome" shall be situated at an adequate distance from the nearest inhabited centre and shall have mosquito-proof dwellings and water-supply. Failing the establishment of an anti-amaryl aerodrome all air traffic from such an area shall be suspended. When yellow fever is discovered in a region, the following measures are to be taken as late as possible before the departure of aircraft. (1) The aircraft and cargo will be inspected for mosquitoes and if necessary disinsectised. (2) The passengers and crew will be medically inspected, those who have been exposed to risk of infection being required to remain under observation either at the aerodrome or elsewhere until six days from their exposure. (3) The names of passengers and crew, with all information available about their exposure to infection, will be entered in the log-book. On arrival in a region in which yellow fever is not endemic but might develop, the aircraft and passengers and crew may be inspected and any person who has not completed six days since his last possible exposure to infection may be kept under observation for not more than six days.

These are stringent regulations and may somewhat hamper the development of air transport in the large region of Africa where yellow fever is now known to be endemic. On the other hand, the danger is a very real one[2] and it cannot be suggested that the precautions are excessive. The appearance of yellow fever in a country such as India would be a very serious matter indeed. It is also to be hoped, as Dr. Hewer suggests, that protection by vaccines[3] may soon be so far perfected as to allow of relaxation of the regulations to persons in a hurry. In any case it was well that the Rockefeller Foundation decided to open a special campaign against yellow fever many years before the dangers from air travel were generally recognised, since it is owing to these workers' efforts that the menace of the "silent" endemic areas was discovered. As the late Sir Walter Fletcher wrote[2]: "It is no stretch of fancy to say that the discovery of the true nature of the disease and of its preventability by vaccination may have come just in time to save us from a world disaster of unthinkable magnitude."

MEDICAL EXAMINATIONS IN DUSTY INDUSTRIES

INTEREST attaches to the principles underlying an order[4] made by the Home Secretary which came into force on Sept. 1st. This order deals with the initial examinations of workmen who seek to be employed in occupations with exposure to injurious dust under the silicosis and asbestosis compensation schemes. It amends a previous order[5] by laying down with greater precision the circumstances with which anyone must comply who is seeking employment in the scheduled industries: the refractories, sandstone, pottery, and asbestos. First, in his own interest, the worker is to be refused employment if his physique falls short of certain medical requirements with regard to development and the absence of pulmonary or cardiac disease. Secondly, in the interest of his fellow workers who, by reason of their exposure to the specific occupational dusts, are unduly predisposed to succumb to tuberculous infection, he is to be refused employment if he is suffering from tuberculosis. Precedents are here being set which may with advantage to the individual and to the community be more widely used in the future. The order of 1931 which is now amended also establishes periodic medical examinations year by year during employment in a scheduled occupation. At these examinations suspension from work may be enforced, if lung disease is found, in the interests of the worker and of his fellows. The way in which these examinations provide valuable data for studying the cumulative effect of the specific dust hazards and the clinical progress of the resulting pulmonary damage is well set out in a recent article[6] by Dr. T. Ferguson on silicosis among sandstone workers in Scotland and the North of England. He shows how sandstone dusts generally render the lungs liable to dyspnœa, bronchitis, and the like, but only certain stones originate the specific silicotic condition; furthermore, wide individual differences exist in capacity to deal with inhaled silica.

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[1] The text is published by H.M. Stationery Office. London. 1934. 9d.

[2] See THE LANCET, 1929, i., 194; 1933, i., 478.

[3] Ibid., 1934, i., 199.

[4] Statutory Rules and Orders, 1934, No. 889. H.M. Stationery Office. 1d.

[5] 1931, No. 341.

CHILDREN IN THE ALPS

THE council of the Queen Alexandra Sanatorium Fund has decided on an important change in policy. The fund, which owes its origin to the appeal for the foundation of an English sanatorium in Davos made by the late Lord Balfour of Burleigh 30 years ago, has investments valued on the Stock Exchange at £64,000 and an annual income of about £2400. Since the sanatorium was given up as a war-time necessity it has been the custom to allocate the income to enable patients of small means suffering from curable tuberculosis to stay long enough in Davos to make a substantial recovery. Last year the number of suitable cases applying for grants was not very large, and it was possible to extend the grants for more than the usual five or six months on medical advice in Davos—an innovation which has the warm support of the London Council; but those who administer the fund have recognised that a limited stay in the Alps, particularly if, as at present, it must be followed by a return to straitened conditions at home, does not produce the best possible return for expenditure. This may be a heartless view of the situation, for there is no question that whatever the effect on physical signs the fund has been able to infuse some cheerfulness and happiness into many lives; there can, however, be little doubt that a strict analysis would prove disappointing, although grants have not in principle been made to patients in an advanced state of the disease. For the last two years the council has had an object-lesson of a different kind in the Davos valley. Owing to the generosity of the president of the Birmingham Children's Hospital (himself a Swiss subject) and the enlightened imagination of its staff, a group of 40 or more Birmingham children have had the opportunity of spending several months in the alps, with results which have been critically watched and assessed by a number of British and foreign pædiatricians. About one-half of these children had had various forms of surgical tuberculosis; the remainder illnesses such as asthma, interstitial pneumonia, recurrent bronchitis, debility, and malnutrition after prolonged ill-health. When last reported, of the 80 children who had been to Switzerland, 41 were discharged "cured" after a stay averaging seven months, and at a cost per patient per week of £2 2*s*. 8*d*.

The experiment is said to have exceeded the expectations of its promoters, and it was this object-lesson which induced the council of the Queen Alexandra Fund a year ago to adopt the principle of helping children. At that time negotiations for collaboration with the Birmingham scheme did not mature and the money was allowed to accumulate, so that for the coming year there is a larger balance available for this purpose, and in fact the council has agreed to allot, if suitable cases offer, as much as half its available income for the purpose. No hard-and-fast rules have yet been laid down as to the qualifications for a child candidate. There is perhaps even now insufficient exact information about the value of the climatic factor in the cure of childish ailments to form a final opinion, but the late Prof. Leopold Moll, from his experience in organising recreative holidays for children of 6 to 12 years old in the Italian, Swiss, and Austrian Alps, formed opinions which must command respect.[1] For children of weak constitution with secondary anæmia, with bronchial asthma, and especially with infiltration of the bronchial glands, he held the alps superior to the seaside, and in his last published work he was impressed with the large percentage of children who could be rid of a relapsing bronchial catarrh by a winter cure in the high alps. The fund's honorary examining physicians in London will decide on its merits any application received for help from the fund, which now has the benefit of the advice of Prof. L. G. Parsons, who was elected a member of council at the recent meeting. It might be thought that there would be difficulties in inducing parents to part with their delicate children to the care of strangers for so long a period, but that has not been the Birmingham experience, and the two institutions in Davos, to one or other of which the children would be sent, have a reputation for homeliness which will soon reassure the faint-hearted.

Practitioners with youthful patients who would, they think, benefit under the scheme should apply for further information to the hon. secretary of the council, Mr. A. Stanley Herbert, 25, Birchin-lane, London, E.C.3, or to the local secretary, Mr. W. G. Lockett, Davos-platz, Switzerland.

MR. SERJEANT SURGEON KNIGHT

A CORRESPONDENT asks for information about serjeant surgeons in general and Dr. John Knight in particular. The serjeant surgeons of England have succeeded each other in an almost unbroken series from 1461 until the present time. They were generally two in number, although occasionally an additional one was appointed or the emeritus title was bestowed on someone whom the King wished to honour. The serjeant surgeons ranked above the King's principal surgeon. It was their especial duty to attend the King on the field of battle. For reward they received a yearly salary of 40 marks (£26 13*s*. 4*d*.) with a "bouge of Court," which was an allowance of meat and drink "with wine, wax and all requisites for carrying out their cures." The wax seems to have been used for embalming the bodies of deceased members of the royal family. Mr. Serjeant Surgeon Knight complained in 1662 that he had received the usual fee for embalming the body of the Duke of Gloucester, but was ordered to divide it with Richard Wiseman, surgeon in ordinary. Various additional privileges appertained to the office in earlier times. The serjeant surgeon was entitled to be considered a past master of the United Company of Barbers and Surgeons. When the company was dissolved in 1745 he was always appointed to the honourable and lucrative office of examiner in its successor the Surgeons' Company. The privileges were curtailed little by little, the official remuneration was consolidated and reduced, until in the end the honour alone remained.

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[6] Jour. of Indust. Hyg., July, 1934.

[1] THE LANCET, 1933, i., 710.

Something is still known of John Knight. He attended Charles II. on his voyage from the Hague to Dover in 1660, and thus became known to Mr. Samuel Pepys, who dined with him on Dec. 30th, 1662. The diary records—

> "Thence to a Barber's and so to my wife and took her at noon to Mrs. Pierce's by invitation to dinner, where there came Dr. Clerke and his wife and sister and Mr. Knight, chief surgeon to the King, and his wife. We were pretty merry, the two men being excellent company."

Knight was constantly occupied with matters connected with the sick and wounded during the Dutch wars and the records of St. Bartholomew's Hospital contain a letter from the Duke of Monmouth, dated Sept. 10th, 1678, asking that sick and wounded soldiers may be received into the hospital on the recommendation of Mr. Serjeant Knight, chirurgeon generall. He may perhaps have been in attendance on his royal master during the Commonwealth period, for on Jan. 5th, 1661, he applied to the governors of St. Bartholomew's Hospital for the minor office of "guide" to the Lock Hospital in Old Kent-road. He brought with him a letter of recommendation from King Charles and was twice interviewed with a view to his election. He seemed to look upon the post as a sinecure and was not chosen. The governors saved their faces by replying to the King that "they had a respect and tenderness to His Majesty's displeasure if they should have conferred the said place upon the said Mr. Knight, hee being constantly soe neer the King's person and the bussines of the said place soe offensive and nautious." It often proved the first rung on the ladder to success, for the guide became assistant surgeon and in due course full surgeon to the hospital.

Knight is still remembered at the Barbers' Hall in Monkwell-street, where he was twice Master of the Company. He restored the priceless cup given by Henry VIII., and he persuaded Charles II. to present the acorn cup in commemoration of his escape at Boscobel. It is also stated that Knight identified the bones of the princes in the Tower and was instrumental in getting them buried in Westminster Abbey in an urn designed by Christopher Wren.

ACETYLCHOLINE IN RHEUMATISM

THE use of histamine in arthritis—given by ionisation or injection—has won much support.[1] Another substance capable of increasing the local circulation of blood is acetylcholine, and like histamine it has been applied to rheumatic joints by ionisation. The actual drug used by J. Kovacs[2] was acetyl-beta-methylcholine, a choline compound which is said to be more slowly destroyed in the body than acetylcholine, while its vasodilatory action is more prolonged and its side-effects are almost negligible. Ionisation is carried out with an asbestos fabric paper pad soaked in a 1 per cent. solution of the compound, and applied under the positive pole of the circuit, a large moist pad electrode being applied to the back of the patient and connected with the negative pole of the battery. The local effects noted were increase of skin temperature up to 10° F., sweating, reduction in swelling, and increased mobility of the joint. If large areas were treated general effects—such as flushing, sweating, increase in pulse-rate and slight fall in blood pressure, salivation, and evidence of increased intestinal peristalsis—might be observed. The results of treatment were best in patients with rheumatoid arthritis. Reduction of pain, swelling, and stiffness was noted in a majority of these after six or eight sessions at the rate of two a week; the patients had been selected for treatment because other methods had failed to help them. In smaller groups of cases of osteoarthritis, bursitis, sciatica, and neuritis encouraging results were also obtained. However, Kovacs wisely concludes that before the value of this form of treatment can be accurately measured, observation of patients over long periods will be necessary.

A PIONEER OF CANCER RESEARCH

THE death of Prof. Jensen, director of the serological institute of the Royal Veterinary College of Copenhagen, removes a historical figure from our midst. Born on March 16th, 1864, he came as a young man under the influence of C. J. Salomonsen and of B. Bang, and took part in the development of what was then the new science of bacteriology. He was interested mainly in the bacterial infections of animals, especially domesticated animals, and published numerous papers on this subject. But important as this aspect of his work is, it is overshadowed by the impetus he gave to the investigation of cancer by his publication in 1903 in the *Centralblatt für Bakteriologie* of a paper entitled "Experimentelle Untersuchungen über Krebs bei Mäusen." Having found repeatedly mice with malignant new growths he had tried to transmit the disease to other normal mice, but at first without success. Eventually, in 1901, he succeeded in transmitting a spontaneous mouse carcinoma to other animals and in propagating the tumour through 19 generations of mice. This tumour, which Jensen freely distributed to other laboratories where its propagation was continued, came to be known as the "Jensen mouse carcinoma." Jensen at once proceeded to investigate the nature of the process involved in this transmission of cancer. He showed that it is possible only in animals of the same species, that it demands the existence of living cells, and that the tumour develops in the new hosts from surviving cells which have been inoculated. The transmission is due, therefore, to a process of transplantation, and not to a process of infection. These observations were of fundamental importance and they have been amply confirmed by subsequent investigators.

CARL OLAF JENSEN

Jensen was by no means the first to have succeeded in transmitting a malignant new growth from one animal to another of the same species. He mentions himself the previous successful experiments of Hanau in 1889 with a rat sarcoma, of Moran in 1894 with a mouse carcinoma, and of Velich in 1898 with a rat sarcoma. Simultaneously with Jensen, Leo Loeb, in 1901, had also recorded the successful transmission of rat sarcomas. But these experiments had aroused little interest in the medical world and had been forgotten. The reason for this unfortunate attitude was that clinicians and human pathologists were convinced that cancer was a disease peculiar to the human species, and that these tumours in animals had no bearing on the cancer problem as it appears in man. Hanau was so disappointed at the neglect of his work, whose importance he fully realised, that he committed suicide. But by the end of the century veterinary pathologists had accumulated a formidable mass of evidence demonstrating the occurrence of cancer in animals. In this country Sir John McFadyean had protested against the statement of clinicians that cancer did not occur in animals. In 1903 E. F. Bashford, the director of the newly founded Imperial Cancer Research Fund, had published a paper emphasising the importance of investigating cancer as a biological problem on a basis of comparative pathology, and in the following year he had demonstrated the occurrence of cancer with all its characteristic manifestations throughout the vertebrate kingdom. Jensen's work was certainly more thorough than that of his predecessors, but it also had the merit of coming at the psychological moment. Thus the experimental investigation of cancer was initiated.

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[1] See THE LANCET, 1933, i., 920 and 988; 1933, ii., 1018; 1934, i., 1226, 1228, and 1366.

[2] Amer. Jour. Med. Sci., July, 1934, p. 32.

Subsequently Jensen made two further contributions to the cancer problem. In 1909 he published a paper on "Übertragbare Rattensarkome." In this paper he described the tumour now so well known as the Jensen rat sarcoma. In the following year he discussed the occurrence of tumours in plants which resemble in their properties the malignant tumours of animals. His work was instrumental in establishing the transmission of cancer. Ten years after the publication of his first paper dealing with this aspect of the disease his colleague in Copenhagen, Prof. J. Fibiger, demonstrated its experimental production.

SKIN DISEASES OF DOGS

WHEN dogs develop skin lesions, such as eczema, ringworm, or mange, the owners usually want to know whether they themselves are likely to catch the infection. Holmes,[1] in reviewing the subject, points out that true eczema in the dog is non-infectious; he attributes it mostly to external irritation by dirt, parasites, impacted anal glands, and like causes. Improper feeding, and possibly renal disease, are regarded as predisposing factors; there is also a dry form of eczema common in certain breeds of dog, which probably originates from endocrine derangement. Removal of the cause of irritation and symptomatic treatment are generally effective. In ringworm, on the other hand, contagion to man is common. It occurs in the dog in dry and purulent forms, and disappears readily if infected areas are cleaned and treated with iodine, but some months must elapse before the danger of secondary lesions is quite over. Of mange also there are two kinds—due to different parasites—the sarcoptic and the follicular. The former, caused by *Sarcoptes scabiei*, is readily contagious to human beings, as was illustrated in a case reported in our columns not long ago.[2] Diagnosis, in the dog, depends upon the demonstration of the acarus, and this can be done without undue waste of time by the sugar flotation technique.[3] Treatment consists of clipping the whole dog and applying sulphur incorporated in an oily dressing. Treatment, if carried out whole-heartedly, is usually successful in four to six weeks. About follicular mange unfortunately very little is known, though it is all too common, especially in certain breeds of dog. The condition is characterised by the presence of a mite, *Demodex folliculorum*, in the deep layers of the epithelium; but as the same or a similar species is a regular inhabitant of the human skin, especially in "blackheads," it would be rash to regard it as the actual cause. The general opinion is that it is not transmissible to man, but in animals it is a serious matter; indeed in the old days it was considered incurable, and destruction of infected animals was usually recommended. In reviewing the subject recently, however, Sen [4] points out that although no specific treatment has yet been devised, the position is by no means hopeless; and, especially in the non-pustular forms, a cure can be effected in a useful proportion of cases. Innumerable types of treatment, both internal and external, have achieved popularity, and it may well be that recovery, when it occurs, is independent of specific treatment. Meanwhile it appears that any measures that tend to improve the general health of the dog may help to bring about recovery from follicular mange.

THE DIAGNOSIS OF PERNICIOUS ANÆMIA

IT might be thought that in the limelight thrown on pernicious anæmia by Minot, Murphy, and others since 1927 the disease would seldom escape recognition. Certainly some of those who suffer from it are embarrassed by the diagnostic and therapeutic enthusiasm of their medical and even lay advisers. Nevertheless Dr. E. Meulengracht,[5] whose work on pernicious anæmia has attracted wide attention, says that of over 200 cases admitted to his hospital about half had been given some other label before they reached his hands. One of the signs suggestive of pernicious anæmia, to which Meulengracht attaches importance, is premature whitening of the hair. Beginning sometimes as early as the twenties or thirties, it often gives the patient a peculiar stamp; and incidentally it is a feature apt to run in families. As regards the diagnostic value of gastric achylia, he considers that in the absence of helminthiasis if there is no gastric achylia the patient is certainly not suffering from pernicious anæmia. He has never seen an exception to this rule, and as for recorded cases of the kind he is inclined to dismiss them as figments of the imagination. He is also sceptical of the diagnosis of pernicious anæmia when the patient is young. His youngest patient was twenty-eight years old when the disease was first diagnosed, and among the 213 cases only 21 were under the age of forty.

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DR. MAURICE FISHBERG, who died in New York on August 31st, will be gratefully remembered in the medical profession as the author of a text-book on pulmonary tuberculosis which for matter, manner, and sense of proportion left little to be desired. Its value was recognised by running into four editions. Dr. Fishberg was born in Russia 62 years ago, and went to America when he was 18 years old, qualifying in medicine at New York University in 1897. He became chief physician to the Montefiore Hospital and clinical professor of medicine in the University. His other strictly medical work was an American edition of Gley's "Internal Secretions." But perhaps his chief interest in life was a study of the physical anthropology of the Jewish race, a sphere in which his views did not meet with general acceptance.

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[1] Holmes, J. W. H.: Vet. Record, 1933, xiii., 603.

[2] THE LANCET, July 21st, 1934, p. 159.

[3] Sheather, A. L.: Jour. Comp. Path. and Therap., 1923, xxxvi., 273.

[4] Sen, S. K.: Indian Jour. Vet. Sci., 1934, iv., 114.

[5] Nordisk Med. Tidskr., July 14th, 1934, p. 925.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XVII.—PROGNOSIS IN EPILEPSY

THERE is probably no other condition in which the prognosis is more anxiously enquired for, nor any in which under certain circumstances it is more difficult to forecast.

The reason for anxiety is obvious. The difficulty in giving a prognosis is to be found in the fact that epilepsy is not an entity; many writers and teachers have emphasised this, and suggested that we should speak of "the epilepsies" rather than of epilepsy. This of course refers to what one is familiar with under the title of "idiopathic" as distinct from symptomatic epilepsy. As we are still ignorant of the ætiological factor in most cases of epilepsy, it is clear that the prognosis in such cases must be doubtful. The effect of treatment must be awaited before it is possible to forecast the future course of the disease.

LENGTH OF LIFE

Does epilepsy tend to shorten life? The answer is that it certainly does so in severe cases, but that early death as the result of a fit is rare. It is certainly possible for some accident to occur which may have a fatal ending during the course of a fit. There are occasional examples of a fit proving fatal to others; witness a recent case in which a car, driven by a person who had a fit, ran into a crowd of people and killed some of them. Status epilepticus is a rare and often fatal condition. Cases in which epileptic dementia occurs do not as a rule reach the allotted span of life. Many of them die of tuberculosis. In mild cases, however, it is not unusual for the patient to reach old age; indeed there is a tendency with advancing age towards spontaneous cure.

DAMAGE TO STRUCTURE OF BRAIN

In certain cases there has been some damage to the structure of the brain. I do not include among these cases where a brain tumour is present, or where the fits are the expression of syphilitic disease. In the first group the prognosis is that of the brain tumour; in the second the outlook is usually good when adequate treatment is adopted. The cases to which I refer are those which follow in the path of diplegia or hemiplegia occurring as the result of developmental defect or birth injury. In such cases there is always the possibility that fits will follow. The prognosis varies a good deal with the mental condition of the patient. If there is mental deficiency, the prognosis as regards the fits is always bad. If there is no mental defect, the probability of epilepsy developing is less and the prospect of the control of the fits under treatment better. The same criterion applies to children who develop fits following encephalitis, with or without hemiplegia. In adults fits may occur as a sequel to thrombosis of the Sylvian artery which has resulted in hemiplegia. The fits are as a rule infrequent and are usually controlled well by treatment, which must however be continued faithfully for a sufficient period—that is for as long as two years after the last fit. With the use of the barbiturates this can be done with less annoyance to the patient than was possible with bromides.

IDIOPATHIC EPILEPSY

In so-called idiopathic epilepsy there are many factors which will help to justify a bad prognosis, but unfortunately few which can be relied on to justify a good one. When the fits have started early in life, when they are frequent and severe, and when in addition there are stigmata of degeneration present, the prognosis is uniformly bad. Among stigmata we may note misshapen ears, deformed teeth in poorly developed jaws, Gothic palates and eccentrically shaped skulls. When some degree of mental deficiency is present as well, it merely serves to emphasise the hopeless prognostic outlook. A history of epilepsy in the antecedents, of insanity, alcoholism or drug addiction are factors of grave prognostic significance, as too may be consanguinity in the parents.

CONVULSIONS DURING INFANCY

Convulsions during infancy tend to affect the prognosis adversely in those developing epilepsy later in life. We must not be too pessimistic, however, in our prognosis in such circumstances, as some cases in which the outlook appears most discouraging do well under treatment. The converse unfortunately is also true, and a patient of fine physique and development, and with a clean sheet so far as family records go, may fail to respond to treatment in a satisfactory manner. Aldren Turner found that the percentage of cases arrested was much the same whatever the family record, but that those with no hereditary history showed a higher percentage of improved cases and a lower percentage of confirmed cases, than did patients with definite neuropathic antecedents. Special note should be made as to whether the family record shows evidence of any toxic idiopathy, or whether the patient exhibits such himself. In these cases, and where asthma and epilepsy may alternate in the same patient, the attacks are almost certainly allergic in origin. Careful research on these lines and appropriate treatment should result in marked improvement or cure.

THE TYPE OF DISEASE

The type of disease is of some importance in prognosis. It is well known that in petit mal it is more difficult to influence the frequency of the attacks than where grand mal attacks only occur. The introduction of the ketogenic diet has, according to American reports, resulted in marked improvement in children suffering from petit mal, as many as 31 per cent. of cases in children under 15 being free from attacks as the result of treatment. I do not know of any statistics based on the treatment of a large number of cases by this method in this country, but my own experience of it has not been so encouraging as that of the American observers. Mention must here be made of the condition known as pyknolepsy, in which children suffer from a very great number of daily attacks of very transient nature, so slight indeed as entirely to escape observation unless they are watched for most minutely. These attacks seem to be uninfluenced by any form of treatment, but the ultimate prognosis is good. Cases of grand mal only are more responsive to treatment as a rule than are cases of petit mal, whilst those who suffer from both grand mal and petit mal form an intermediate group. In the latter group, however, should the attacks be frequent, the probability of dementia occurring sooner or later is greater than in the other two groups.

Patients whose attacks are *nocturnal only* are more happily situated than those whose attacks occur only by day, but there is some evidence to *suggest that, in the former group, the attacks are less* likely to be arrested as the result of treatment.

AGE-INCIDENCE

The age-incidence of the disease has some bearing on prognosis, for where epilepsy begins under the age of 10 the prognosis is usually worse than at any other age. Cases which occur at puberty are much more numerous than those which occur at the climacteric, though the outlook for the latter is better than for the former group. With advancing years as is well known, the tendency to develop "idiopathic" epilepsy diminishes. In what may be called senile epilepsy, taking the age of 50 (for this purpose only) as the beginning of the senile period, the prognosis is probably better than in any other group.

It is a truism that the longer the fits have lasted, the less chance there is of their arrest, and the prognosis so much the worse; epilepsy not being a self-limiting disease, but rather the reverse. Every effort should therefore be made to control the fits from the first.

TRAUMATIC EPILEPSY

Traumatic epilepsy is a condition in which fits develop as the sequel to a brain injury. It does not seem that those cases in which fits occur at the time of the injury are more likely to develop epilepsy subsequently than when this is not the case. The injury to the brain may affect any part of it. I mention this because I have met with a fairly widespread belief that unless the motor centre is injured epileptic attacks will not occur as a sequel. The attacks may be of any variety, either focal (Jacksonian) or generalised. Grand mal, petit mal, or both may occur in this group of cases. Statistics vary as to the proportion of cases of head injury in which epilepsy follows as a sequel, but it is much smaller than one might expect. Percy Sargent found only 800 in 18,000 cases of head wounds. Bathe Rawling, in a smaller group of cases, found a much higher percentage of epileptic incidence—namely, 25 per cent. in a series of 425 cases. In any particular case of head injury the odds are against the development of epilepsy as a sequel. When it does occur, it will be found that in many cases the fits can be controlled by adequate medical treatment. In some instances, as Foerster and Penfield have shown, surgical intervention with removal of scar tissue will result in cessation of the fits. Where fits occur in association with severe injury of the brain, the probability of dementia occurring is considerable. In such cases the fits are likely to persist in spite of treatment.

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SPECIAL ARTICLES

THE UREA-CLEARANCE TEST

By E. Hinden, M.B. Camb., M.R.C.P. Lond.
FORMERLY HOUSE PHYSICIAN AT ST. GEORGE'S HOSPITAL, LONDON

This paper contains a discussion on the urea-clearance test as elaborated by the work of Addis and Van Slyke. The observations recorded were made on 2 normal controls and 16 patients in St. George's Hospital.*

It has long been known that the efficiency of the kidneys to keep the blood constituents at a constant level is seriously damaged in Bright's disease, and a need was felt for some method of expressing in numerical terms the remaining power of the kidney. Such a method would materially assist the physician in following the course of a case of nephritis, and would be invaluable for prognosis; and some such test, no matter how rough, is essential before many surgical procedures may be undertaken. In some cases, in which an acute illness, such as scarlet fever, is followed by an acute nephritis which clears up but for a slight persistent albuminuria, an expression for kidney function is needed before it is possible to say whether the kidney is permanently damaged.

In searching for some one constituent to use as an indicator of kidney function, attention was soon directed to urea. This substance is physiological (that is, it is not foreign to the normal environment of the working kidney), it is present in blood and urine in easily measurable quantities, it is a non-threshold body, and it is non-poisonous, so that for purposes of experiment it may be given in large quantities. At first it was proposed to use the urine urea alone; but this is liable to so many *fluctuations* owing to food, exercise, and urinary volume that the results obtained are not consistent. Modifications of this test, however, such as the urea percentage in urinary samples obtained after taking urea by mouth, are still in practice. Then it was proposed to use the blood-urea alone; this was soon abandoned, for it was found that the blood-urea did not rise after one kidney had been removed and the functioning tissue had thus been reduced to half. This showed that the blood-urea level could not be used as a measure of kidney function.

On theoretical considerations alone, it appears impossible to separate these two factors. The environment in which the kidney works is the blood stream, and it is evident that the results of its labours will depend upon the concentration of the urea in that stream. It is also clear that the concentration of the urine will not be, in general, independent of the volume of the urine. It was these considerations which led many workers to investigate the relations between all these factors.

The first to publish results was Ambard.[1] He published two numerical laws, expressing a relation between the blood-urea, the concentration of urea in the urine, and the amount of urea passed by the kidneys.

His laws were as follows: When the concentration of urea in the urine was constant then the blood-urea varied as the square root of the urea passed; and when the blood-urea was constant then the quantity of urea passed varied inversely as the square root of the concentration of the urea in the urine. Nowadays it is usual to express all the data in terms of blood-urea (=B), concentration of urea in the urine (=U), and the volume of urine passed in unit of time (=V). The usual unit of time is one minute. Expressed in these quantities Ambard's law becomes: $\frac{U^{\frac{3}{4}}V^{\frac{1}{2}}}{B}$ *is constant. This constant can be worked out for normal individuals, and then the value obtained* in cases of nephritis compared with it. This method was much used by French clinicians during the first decades of this century.

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* The 2 controls and 5 of the patients were seen by me, and I collected the specimens from them. The details of the other 11 cases were collected from the medical register of the hospital. All the biochemical analyses were performed in the hospital biochemical laboratory.

In America, Addis and Watanabe tried to verify this work. They discovered [2] that the law did not hold good in very many cases, and concluded that Ambard only obtained the agreement he did because his material was so scanty. They found that the law did not even give the trend of results—i.e., according to the law, when the blood-urea is constant, if the concentration of urea in the urine rises then the total quantity of urea passed should diminish, whereas it often increases. They performed many experiments, both on rabbits and human beings, in an attempt to formulate a law which would give better agreement.

After much testing, Addis and his co-workers came to the conclusion that the ratio—urea in urine : blood-urea—was constant both for the individual and for the species, provided certain conditions were in force. The most important of these conditions was that the kidneys should be working at full load. It is known that there is a large reserve power in the kidneys, so that unless they are exercised to their full extent slight damage will not be apparent. Hence it is important to give urea and water by mouth, and so cause a forced diuresis. They found that the ratio fluctuated with the urine volume, but not regularly so, and that it was much more stable when the urinary volume was high—another reason for encouraging diuresis.

As an example of the importance of giving urea, they worked out the ratio on a rabbit before and after ligating one ureter [3] and found no difference; but on comparing the ratio before and after the operation, having given urea in each case, the ratio was depressed to half its former value. This was confirmed in a later piece of work.[4] Here it was shown that when recovery after nephrectomy has taken place, the urea excretion can be as large as 98 per cent. of the normal, even though the amount of functioning kidney tissue, as measured by the weight of the remaining kidney post mortem, was only 66 per cent. of the total kidney tissue before the operation. The ratio was the only numerical evaluation of function that was depressed by the operation.† Finally, all this has since been confirmed on dogs.[5]

Let us consider the meaning of this ratio with regard to the working kidney. The ratio is the result obtained by dividing the total quantity of urea excreted by the kidneys, in one minute, by the quantity of urea contained in 100 c.cm. of blood. It is therefore equal to the number of cubic centimetres of blood cleared of urea in one minute. Thus, expressing Addis's results in words, it means that when the kidney is working at full pressure, then the quantity of blood cleared of urea in one minute is fixed, and is independent of the concentration of the urea in the urine. In a number of normal human beings this number came to 75–76 c.cm., and this has been taken as the normal figure for kidney efficiency. It is important to realise that this figure, and its explanation, as the amount of blood cleared of urea, is independent of any theory as to how the kidney performs its work. It must not be taken as meaning that actually 76 c.cm. of blood flow through the kidney, and that this quantity is completely cleared of urea; there is evidence, based on urea estimations of the blood in renal artery and vein,[7] that only 50 per cent. of the urea is cleared. This would mean that 152 c.cm. of blood flow through the kidney, losing half their urea while so doing. This figure for the renal blood flow is confirmed by the figures of the creatinine clearance.[8]

In another series of experiments, Addis measured the value of this ratio on rabbits of different sizes, on rabbits after experimental nephritis, and after nephrectomy, and showed [9] that the value of the ratio was almost perfectly proportional to the weight of the kidney tissue, as measured post mortem. He found, too, that in human beings this ratio was not quite constant, but differed according to the size of the individual.[10] This was confirmed by McKay,[11] who showed that the ratio varied with the surface area of the body, and that the kidney weight also varied directly with this expression; this was confirmed by Van Slyke [12] working on children. He showed that the ratio was proportional to the surface area, and that the weight of the kidneys was proportional to this and not to the body-weight.

It appeared, then, that in this ratio clinicians possessed a numerical expression of the functioning power of the kidney. In order to make sure that it did not depend on factors outside the kidney, a further series of observations was taken on this ratio under different conditions. Thus it was found that both adrenaline [13] and pituitrin [14] affected it somewhat, while the ingestion of salt [15] and dextrose [16] had no effect. The taking of food increased the ratio, but only after the fourth hour; this appears to be due to the protein alone,[17] for it has been shown that the purin diuretics have no effect on the ratio,[18] while fasting [19] and low protein intake [15] lower it. In confirmation, high protein feeding raises the ratio.[20] It was shown, too, that vigorous exercise would lower the ratio to 50 per cent. of its normal value,[21] although it appears that mild exercise in normal people might raise it [22]; but in nephritics even mild exercise depresses the ratio considerably.[23]

TECHNIQUE

In order to get comparative results, Addis and his workers then formulated the following technique, which keeps all the foregoing factors constant:—

1. The test is done when the subject is in bed.
2. In order that the effects of food may be eliminated, the test is done first thing in the morning, and no breakfast is given.
3. Fifteen grammes of urea are given at 7 A.M. in 1000 c.cm. of water. Then, till 12 noon, the subject drinks 500 c.cm. of water hourly. This raises the blood-urea and causes copious diuresis.
4. Urine is collected for each of the hourly intervals, from 9–10, 10–11, and 11–12. Blood is collected about half-way in each hourly interval.

The chief objection to this technique is that it involves the patient being in hospital overnight, and three blood collections. This first condition makes it difficult to carry out the test in private practice. Also, in cases of nephritis, it disturbs the patients to collect the urine so frequently, and some of them, especially women, find difficulty in emptying the bladder completely while lying down. It must be emphasised that consistent results are obtained only when the physician himself collects the various specimens; otherwise it often happens that the urines are not collected at the proper times. Often the patient cannot empty his bladder just at the right moment; but this is immaterial if the actual time is noted, as what is wanted is the minute volume, not the total quantity passed.

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† Addis explains the fact that the remaining kidney was as much as 66 per cent. of the two together, before operation, on the grounds of compensatory hypertrophy. It is known [6] that this hypertrophy can take place under certain conditions. Even so, the value of the ratio was 78 per cent. after nephrectomy, instead of the expected 66 per cent. This was explained by Oliver in the same paper, who showed, on careful sectioning of the remaining kidney, that the hypertrophy affected chiefly the glomeruli and the first part of the convoluted tubules—i.e., just the secreting parts of the kidney. This means that the true functional hypertrophy was greater than the gross hypertrophy, as measured by the increase in weight of the kidney. There was no evidence of hypertrophy in the dog,[5] and here the weight of the remaining kidney was 54 per cent. of the total renal tissue, and the ratio was 56 per cent. of its value before the operation.

It must be mentioned that some other workers attempted to verify Addis's work,[24] but did not find consistent results. On close examination of their data it appears that they left the collection of the specimens to nurses, and did not force diuresis by withholding urea. These factors are quite sufficient to invalidate their results; hence their criticism of Addis lacks weight.

In order to simplify the technique Van Slyke and his co-workers [25] undertook a complete re-examination of the whole problem. They investigated the relations between the blood-urea (=B), urine-urea (=U), and urine volume (=V) when the kidney was not working at full load. They also made the correction for surface area, by estimating the surface of the subject from the height and weight, comparing this area with the normal of 1·73 sq. metres, and dividing the urine volumes by the factor so obtained. They considered the relation between V and the ratio U : B. They gave the term "clearance" to the quantity of blood cleared of urea in 1 min.=UV/B. They found that, provided V was more than a limiting value, this clearance was constant both for the individual and for the species. In a later piece of work [26] they showed that for most individuals this limiting value was 2 c.cm. Incidentally, this confirms Addis's work, for the diuresis produced by 15 g. of urea always raises V above this figure, and Van Slyke's clearance is the same as Addis's ratio, which is therefore also shown to be constant. This limiting volume they name the "augmentation limit."

But it was further discovered that even when the urine volume fell below this limit, there was still a relation between the clearance and the urine volume. It was found that the clearance varied as the square root of V. From this it follows that, in order to compare different individuals, it is first necessary to find out what their clearances would be at some standard volume of urine per minute. The standard volume which they chose for this purpose was 1 c.cm. per minute, for this simplifies the arithmetic of the calculation, and also is the average normal urinary output (for 1 c.cm. per min.=1440 c.cm. daily, which is approximately the normal output). The clearance calculated to this level of volume they called the standard clearance, written C_s, and it is numerically obtained by the formula $UV^{\frac{1}{2}}/B$ (for if UV/B varies as $V^{\frac{1}{2}}$, then $UV^{\frac{1}{2}}/B$ must be constant). The value of C_s for the normal individual is 54 c.cm., although Bruger and Mosenthal [22] obtained higher figures. The clearance obtained when the minute volume is above the augmentation limit they called the maximum clearance, written C_m. Its value for the normal individual is 75 c.cm. The close similarity between this standard clearance formula of Van Slyke and Ambard's law is apparent when they are compared: the one is $UV^{\frac{1}{2}}/B$, the other $U^{\frac{3}{4}}\,V^{\frac{1}{2}}/B$; and as U varies from 1–2 usually their value is nearly equal. It can also be shown that the two values for the clearance are mutually consistent. Thus, let us imagine a case where V was just about 2 c.cm. per minute. Then we could calculate the kidney efficiency from either formula, and the ratio between these two values would be $UV/B : UV^{\frac{1}{2}}/B$, or $V^{\frac{1}{2}} : 1$; and as $V=2$ this would equal 1·4 : 1. But the ratio of $C_m : C_s$ is 75 : 54, or also 1·4 : 1.

It is clear that now we have a much simpler method of estimating kidney function. It is sufficient to keep the subject quiet, and there is no need to give urea or to attempt diuresis (in many nephritics it is not possible to cause diuresis). All that is necessary is to collect two consecutive specimens of urine at hourly intervals, and to obtain one specimen of blood mid-way between these two; then, if V is greater than the augmentation limit of 2 c.cm. per minute, the formula for maximum clearance is used, and the result compared with 75; otherwise the standard clearance is calculated, and the results expressed as a percentage of 54.

This technique was adopted in all the cases here collected. In order to make sure that there would be no complications due to food the test was done in the morning before breakfast. At 9 o'clock the patient emptied his bladder, and that was discarded; then the urine was collected at 10 and again at 11 o'clock. A sample of blood was taken at 10 o'clock. In each case if the patient did not empty his bladder at the precise time then a careful note was taken of the hour, and so the minute volume could be calculated. In some cases 15 g. of urea was given beforehand in a quantity of water.

Comparisons have been made of this test with others. Thus the rise of plasma sulphates runs parallel with a fall in clearance,[27] but the series was too small to allow conclusions to be drawn. It is much more delicate and accurate than the uric acid level.[28] Anæmia runs parallel to the older tests for kidney function,[29] but this test is more delicate than the older ones, so that it gives evidence of kidney impairment before the blood does. Figures obtained by considering the creatinine clearance correspond very closely to those given by urea clearance, but the estimation is much more difficult to carry out.[30] Bruger and Mosenthal [31] and Van Slyke [32] both find that this test is the best and most delicate of all those in common use.

FINDINGS

Before considering the results obtained in this series a brief review of the literature may be appropriate. The first to be noticed is the work of Addis, who followed up several cases from the onset of the disease to the termination in death or recovery.[9] Van Slyke and his co-workers trace 67 cases of Bright's disease [33] for long periods. There it is shown that in acute nephritis the clearance always fell to 50 per cent., and may fall as low as 20 per cent., but this fall has no prognostic importance; they were, however, able to draw the important conclusion that if no improvement took place in four months the case was certain to end fatally. It was not possible to draw inferences in the other types of Bright's disease. Life could be maintained comfortably on 15 per cent. of functioning tissue, but uræmia is certain when it drops as low as 5 per cent. It is also known that the blood-urea does not rise till the clearance falls to 50 per cent.[34] Van Slyke has since worked out a quick colorimetric method of evaluating the clearance.[35]

Other workers have since published series of cases. In the United States Bruger and Mosenthal [36]; in South America, Schultz Ortiz [37]; in England, Poulton and Ryffel [38]; and in Italy, Lazzaro.[39] All these workers confirm Van Slyke's conclusions. The value of the test in pregnancy and the puerperium has been pointed out by several American investigators.[40 41 42 43] In this last paper, however, Cantarow and Ricchiuti find low values during normal pregnancy, which values rise to the normal during the puerperium; this was not found by any other worker in this field. In children the test is useful but difficult to interpret,[44] probably owing to the difficulty of finding the augmentation limit.[45] Finally, tribute to the test in urological surgery has been paid both in America [46] and in this country,[47] though opinion is not unanimous on its being the best.

The results obtained at St. George's Hospital are set out in Table I. I wish to thank the members of the honorary staff for permission to quote cases.

TABLE I

Case.	Clearance.	Percentage of normal.	Case.	Clearance.	Percentage of normal.
1	S.	103	9	S.	66
2	S.	93	10	M.	100
3	S.	30	11	M.	26
4	S.	26; and 1 wk., later,	12	S.	9
	M.	21. and	13	S.	22
	S.	26	14	M.	15, and
5	S.	19; and 2 wks., later,		S.	18
	M.	42	15	M.	20
6	S.	20, and	16	M.	83, and
	M.	12: and 6 wks., later,		S.	91
	S.	11	17	S.	60
7	S.	45; and 1 wk., later,	18	M.	22
	M.	51			
8	M.	26, and			
	S.	11			

S. = standard ; M. = maximum.

In those cases where only one number stands in the "percentage of normal" column, it means that both specimens of urine were standard or maximum, and the number given is the average of the two estimations obtained.

These cases fall into three groups, according to the degree of impairment of the renal efficiency. (Table II.)

TABLE II

GROUP I. Kidney function normal.		GROUP II. Moderate impairment.		GROUP III. Severe impairment.					
Case.	P.N.	Case	P.N.	Case	P.N.	Case	P.N.	Case	P.N.
1	103	7	48	3	30	8	18	14	16
2	93	9	66	4	24	11	26	15	20
10	100	17	60	5	32	12	9	18	22
16	87	..	..	6	15	13	22	..	..

P.N. = Percentage of normal (averaged).

In each case two specimens of urine were obtained, so that two estimations of kidney function were made for each test. In the majority of cases both these estimations were either standard or maximum, but in five cases one was standard and the other maximum. Estimations have throughout been expressed in percentages of the normal, so that it is possible to compare results obtained in either of these forms. In two cases (Nos. 6 and 8) the differences are considerable: the figures are 20 and 12, and 26 and 11. Both these patients are females, and the error is probably due to incomplete emptying of the bladder on the first occasion. The test was repeated later on No. 6, and the result obtained then agreed with that given by the second specimen of urine on the first occasion, bearing out this theory as to the error. In four cases (Nos. 4, 5, 6, and 7) the test was repeated after an interval. In Nos. 4, 6, and 7 the second result was very close to the first, but in No. 5 there was a wide divergence, from 20 at the first to 42 at the second occasion. This cannot be explained by an improvement in the clinical condition, which actually deteriorated. There was probably some error in the actual performance of the test. The correction for surface area was neglected. This does not appear to have invalidated the results, for they closely follow the clinical findings. In the case of No. 16, a youth aged 13, a figure of 86 per cent. would have been nearer 100 per cent. if this correction had been made.

Nos. 1 and 2 were normal controls, and their figures, 103 and 93, are well within the limits of normal variation. No. 16 was suspected of chronic nephritis on the grounds of an attack of scarlatinal nephritis and occasional albuminuria. The test showed perfect function. No. 10 was suspected of nephritis because he had persistent pains in the back and was puffy under the eyes. The clearance was normal, and radioscopy showed lumbar osteo-arthritis. All these cases have normal function, and clinically also there was no nephritis.

The next group show moderate impairment. No. 17, with a clearance of 60 per cent., had signs of nephritis, in that there was persistent albuminuria, but the blood pressure was low and there were no other signs of disease. No. 9 was a surgical case, who showed 66 per cent. of function; in accordance with this, prostatectomy was perfectly successful. No. 7 had definite signs of general arterial disease in his legs and thorax, and actually died of a coronary thrombosis. He showed a trace of albumin in his urine, and his clearance was 48 per cent. of the normal. It is noteworthy that his blood-urea, without the ingestion of urea, was 0·044 per cent., which is only just outside the bounds of normality, while as shown by the test he had only 50 per cent. of functional renal tissue.

All the other cases show marked impairment of function, and there was corresponding clinical evidence of advanced nephritis. No. 3 had bilateral hydronephrosis and polycystic disease. He had a clearance of 30 per cent., and clinically was very ill. No. 4 had severe nephritis of the "nephrotic" type, and her clearance was about 23 per cent. of the normal. In her history after leaving hospital she showed a tendency to low-grade septic conditions. No. 5 was a severe nephritic, with a clearance of about 20 per cent. at first, which rose later to 40 per cent. No. 6 was in the terminal stages of acute hæmorrhagic nephritis following tonsillitis. Her clearance at first was 16 per cent., falling six weeks later to 11 per cent. A few months later she died in uræmia. No. 8 was first diagnosed as nephritis during a pregnancy. It is not possible to say from the history whether she had nephritis before her pregnancy or whether it was the latter event which started the kidney trouble. When seen in hospital she had advanced nephritis clinically, and her clearance was about 18 per cent. No. 11 was in hospital over one year ago with severe nephritis. On admission this time her clearance was about 25 per cent. Her illness started six years ago with scarlatina. No. 12 was a very severe case, with a blood pressure of 235/155. Her clearance was 9 per cent., and her vision was failing. Probably she was near uræmia. No. 13 was a nephritic, with a history of decapsulation performed 13 years ago. He showed signs of nitrogen retention, and his clearance was 22 per cent. No. 14 is very similar. Her clearance was only 17 per cent., and her blood pressure 240/140. No. 15 had scarlatina 12 years ago. He had signs of advanced kidney disease, with nitrogen retention. His clearance was 20 per cent., and five weeks later he died in uræmia. Post-mortem findings include small atrophic kidneys and an enlarged heart. No. 18 had severe nephritis, with a clearance of 22 per cent. It was not certain whether his disease was due to the syphilis from which he was suffering or whether it was caused by the arsenical treatment he had been having.

SUMMARY AND CONCLUSIONS

The development of laws concerning kidney excretion is described, leading up to Addis's ratio and Van Slyke's modification of it. This worker showed that if the urinary volume was greater than the "augmentation limit" of 2 c.cm. per minute, then the expression UV/B was constant, and, if not, then $UV^{\frac{1}{2}}/B$ was constant. It was further shown that the amount of functioning kidney tissue was proportional to the value of this constant, and therefore in cases of nephritis it gave a valuable measure of the renal damage. It is, however, not safe to trust to one single estimation if it gives a low value.

Various workers have shown that this estimate of kidney function follows the clinical condition of the patient better than any other. The value of the estimation afforded by the test is greatest in cases of moderate impairment, for most other tests show no difference at all in these circumstances. Thus it has been shown that at least half of the functioning tissue must be destroyed before the blood-urea rises. Eighteen people were subjected to the test, and in all cases the test was an accurate picture of the clinical condition.

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HERTFORD BRITISH HOSPITAL, PARIS.—This hospital, which was founded and endowed by the late Sir Richard Wallace, has had an annual deficit since 1930, due to the increased cost of living and the necessity of providing additional accommodation. The fall in the exchange value of the pound has now reduced the income by about 40 per cent. and there is an annual deficiency of £2000. The hospital gives *its services to all* subjects of the Empire living in, or visiting, France.

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF SURGERY

Prof. G. GREY TURNER, *the president, took the* chair at a meeting of this section when a paper on

Physical Efficiency after Operations for Hernia

was read by Mr. MAX PAGE (London). In five years' operations at St. Thomas's Hospital, he said, the relative incidence had been 11 inguinal hernias, 1·4 femoral, and 1 ventral. He therefore took inguinal hernia as his text. In spite of all the consideration given to it, agreement about the best method of treatment had not been reached, largely because the information about late results was inadequate or inaccurate. A close and critical follow-up of all cases would reveal a far larger proportion of recurrences than was *generally* believed. His own confidence in the operation had been shaken by his experience with the Metropolitan Police; for in the five-year period 1929–34, of 241 operations performed on police officers, 11·5 per cent. were for recurrence. Further investigation suggested that the true rate was even higher. Block's analysis of continental figures gave a recurrence of 34·8 per cent. after two years, and this author declared that 40 to 45 per cent. of recurrences were avoidable. The majority seemed to be internal direct hernias, and the suture material used *seemed to have little influence. After quoting* the numbers in other reports, Mr. Page admitted that he really did not know quite what he wanted to prove. The *astonishing differences between the* statistics he had quoted could hardly be laid at the door of any special technique. His own conviction was that recurrence was commoner and more difficult to avoid than was generally thought. The factors influencing success were the technique and its failures, post-operative pulmonary complications, operation on double hernias, and congenital feebleness of the musculature.

Mr. G. L. KEYNES (London) *declared that the only* possible attitude was to aim at complete physical *efficiency and deal with almost* every hernia. No patient should be condemned to wear a truss after operation, and every patient, except possibly the old and infirm, should be able to carry on with his work. Out of 10,000 or 12,000 patients whom he had attended at the City of London Truss Society, only 500 or 600 had had recurrences. There was too much *dependance on standardised operations*, and the surgeon must possess a sufficiently large operative repertory for all cases. Incorrect diagnosis between direct and indirect hernias was a prolific cause of recurrence. All recurrence was due to failure in technique, for if the tissues were not strong enough a more elaborate operation was called for. The allegation of a hereditary tendency was merely an attempt to justify failure. He showed a number of *slides of various conditions* many of which illustrated the use of Gallie's fascial suture.

Mr. T. A. HINDMARSH (Newcastle-on-Tyne) reviewed 154 cases operated on in hospital, nearly all labourers. Out of 102 *patients with inguinal hernia* 89 were perfectly satisfied, 9 had recurrences, and 4 had severe pain and tenderness in the scar. Twenty-three out of 26 femoral, 11 out of 13 umbilical, and 8 out of 13 ventral operations had been successful. It was nearly always *possible to succeed in the important aim* of saving the patient from wearing a truss. It was essential to remove the sac completely. Sixty per cent. of recurrences were due to suppuration and infection, and a fairly large proportion to choice of a wrong type of operation. It was dangerous to tie sutures too tight, and if they were not tied carefully the conjoined tendon might be split. He considered that three weeks was not a sufficiently long convalescence. It took six weeks to get firm fibrous tissue, and he would therefore advocate three weeks in bed, followed by ten days on a couch and then by six weeks' progressive exercise. If the anæsthetist allowed the patient to come round too soon, damage might be done on the table through vomiting before bandages were firmly applied. Excessive distention of a ventral hernia before operation should be controlled by 0·5 c.cm. of pituitary extract every three or four hours.

Mr. E. M. Cowell (Croydon) mentioned as factors in success wide resection of the hernia sac, the covering of the weak point with suitable pedunculated fascial flaps, the use of fascial sutures, and the encouragement of a return of muscle tone with suitably graduated exercises. Peebles's hernia of the linea semilunaris was rare but important. He had found 6 in 500 cases, 2 having been overlooked at the original operation. He showed slides illustrating his modification of Gallie's method by which he used a much shorter strip of fascia. He recommended that patients should be directed to contract their abdominal muscles at about the fourth day, and that they should be out of bed at the end of the week and back to work as soon as possible. His recurrence-rate was, he said, about 4 to 5 per cent.

Mr. Philip Turner (London) said that while it was important to remove the sac, it was almost as important to close the opening in the fascia through which the sac made its way. He described his operation for curing large hernias in elderly patients. He advocated the principle of plastic surgery, the replacing of tissues by like tissues. He said that the series of patients mentioned by Mr. Keynes now numbered about 100; all had been followed up, and the recurrence-rate was very small. The result showed that, if the patient's general condition was fairly satisfactory, it was possible to operate successfully on a hernia of almost any size at practically any age. In many cases a testis and the spermatic cord could be sacrificed with advantage. Hernioplasty was as effective in direct as in indirect hernia. Sliding hernias were more troublesome, but many could be treated satisfactorily in this way by cutting away redundant peritoneum, enlarging the opening in the retroperitoneal tissue, pushing back the large intestine, cutting a flap and pulling it over, and sewing up the opening in the transversalis fascia.

Mr. W. McAdam Eccles (London) spoke on his experiences 35 years ago with the City of London Truss Society. In those days operation on hernia was not nearly so common as to-day. Congenital hernia in young males should, he said, be operated on in the first few years of life or physical efficiency was in danger. A truss was not a nuisance if properly made and adjusted. Some elderly labourers were quite efficient and comfortable in trusses and were made worse by operation. Preparation and after-treatment were more important than the operation itself. The results would be better if asepsis were more rigidly observed. He recommended ten days in bed and ten days' progressive exercise about the ward. Hernia was compensated under statute as an industrial accident, and the patient should be tempted to do light work before heavy work.

Mr. R. Wood Power (Hereford) urged concentration on ventral hernia, which he said was by far the most difficult to operate on successfully. The muscle was lacking, and recurrence was high even after the Gallie graft. The graft must have no strain on it. He described a method of replacing the opening by a sliding graft from the rectus muscle.

Mr. P. H. Mitchiner (London) said that a workman could often carry on his work efficiently even if his hernia recurred. Ninety per cent. of policemen with recurrence were doing full duty without complaint. In the young man, where the inguinal ligament and conjoined tendons, together with the attached oblique and transversalis muscles, provided the mechanism for keeping the contents out of the sac, the hernia would only come down when tension on these muscles was prolonged. This strain should be removed rather by turning the end of the muscle into the scar than by an elaborate repair operation. His results showed 3 per cent. of patients with recurrence, quite a number of whom could work. Repair was necessary when tissues gave way, as in fat and elderly people. If the repair depended on scar tissue, the patient should stop in bed at least three weeks. A well-fitting abdominal belt was the best treatment of recurrence.

Dr. John Ramsay (Australia) spoke of the value of kangaroo tendon. He said that sufficient use was not made of the spare fascia, which could be rolled and folded up; if this were not sufficient, a flap could be turned off the anterior rectal sheath. Potential pouches off the posterior wall of the inguinal canal could become sacs if the peritoneum were not made smooth at the operation.

Mr. R. Kennon (Liverpool) declared that, though he might be riding for a fall, he was not at all depressed about his results, which showed some 3 per cent. of recurrence. Femoral hernia was the commonest variety in women. The direct hernia was the most difficult to deal with, and it was therefore unwise to weaken the area with scar tissue.

Prof. A. W. Sheen (Cardiff) stressed the opinion that hernia operations should only be performed by comparatively experienced surgeons. He recalled a visit from the great French surgeon, Lucas-Championnière, who had insisted on strict asepsis. This authority had divided a small part of the internal oblique muscle and had made his way to the extreme top of the sac, and had left the peritoneum smooth, displacing the neck if he wished. The filigree was valuable when good, but highly detrimental when bad; its chief use was for large inguinal hernias and, when properly applied, for umbilical ruptures.

Mr. R. B. Blair (Hull) said that recurrences among dock labourers were very few. He advised light work after six weeks and ordinary work after six months.

Mr. A. B. Rooke (Bournemouth) said that he hesitated to advise operation if there were a chronic cough. Early movement was not always harmful. When abdominal muscles were infiltrated with fat and the fascia resembled butter, the patient's condition presented an almost insuperable obstacle.

The President reminded the meeting that results were judged by the working community, who pressed for operation in almost all circumstances. The results from applying present principles were sufficiently good to encourage surgeons to continue on the same lines. In considering results it was unfair to make no distinction between the older patients, with their changed tissues, and the younger. One-third of his patients with umbilical hernia had recurrence. It was not enough to be content with an ex-patient's reply on his condition, for he was likely to overlook a recurrence; a competent examiner should see him. Operation should be advised, because if it were not done and if the hernia strangulated later, chances of relief were very remote. The true criterion of cure was absence of recurrence in later life, when the tissues deteriorated.

SECTION OF RADIOLOGY AND ELECTROTHERAPEUTICS

Dr. D. D. MALPAS (Boscombe), vice-president, took the chair at a meeting of this section at which a paper on

Radiology as an Aid to the General Practitioner

was read by Dr. DOUGLAS WEBSTER (London), the president. Radiologists, Dr. Webster believed, would become more useful to their colleagues and the community when they regarded themselves primarily as physicians. The value of a diagnostic method depended on the light it could throw on obscure clinical problems, and especially on its ability to provide pathognomonic signs. Radiology had brought forward a greater number of such signs than all the previous centuries of clinical observation. Instances of these were bronchiectatic cavities, horizontal fluid levels, and gastric ulcer craters. Radiotherapy had also made immense advances and new discoveries were being made almost yearly, especially in the field of inflammatory infections. X rays and radium were the only agents known to have an influence on malignant growths. The first criterion of the value of radiology was that it must be good. There had been far too much imperfect radiology: hundreds of military recruits, for instance, had been rejected for a non-existent "peribronchial phthisis." Haenisch had recently held that the problems of correct interpretation were so great that there could be no "minor roentgenology" corresponding to "minor surgery" or "minor pathology." Dr. Webster, on the other hand, maintained that nearly all fractures and dislocations, many foreign body localisations, and much of the fields of elementary thoracic and genito-urinary diagnosis could be called minor roentgenology. If no distinction were to be made, he asked, how would it be possible to prevent technical assistants, radiographers, or general practitioners from practising radiology to a greater or lesser degree? Granted that interpretation was a medical prerogative, technical and elementary diagnostic radiology could not be restricted to medical specialists. On the other hand, there could be very little minor radiotherapy except in connexion with certain skin diseases. He considered that unqualified practice in radiology should be forbidden by law, just as the prescription and administration of drugs were forbidden.

Radiology had recently, he said, been recognised as a specialty by the institution of diplomas and by the insistence on the training in it of students. Dr. Webster laid stress on the need for a reasonably full and precise training of students; if the curriculum was over-burdened, he argued, much of what was unnecessary in it should be excised to make room. Unless the achievements of radiology were so exhibited as to make a wide appeal to the general practitioners of each country its diagnostic and curative possibilities would largely remain as locked-up capital. Private practitioners had the unique position of being the first to see most of the patients. They were thus able to advise medical, surgical, or other specialist treatment. Their coöperation must be solicited if the general level of health were to benefit by new knowledge. Much delay in diagnosis was due to ignorance of the possibilities of radiology. Some patients suffered for years from undiagnosed gastric symptoms and others spent years of ill-health with Graves's disease, leukæmia, and menorrhagia before radiotherapy was adopted. The most important sphere in which the coöperation of the general practitioner was essential was in the early diagnosis and treatment of cancer. Many patients were already at an inoperable stage at diagnosis, and many others were not good operative risks or were unwilling to submit to operation. The possibilities of radiotherapy should therefore be widely known. The first treatment was the all-important treatment, and it was quite indefensible to delay an appeal to the radiotherapist until surgery had proved a failure. Active campaigns in radiology had resulted in Sweden in a material raising of the general public health. A similar campaign in this country would have equal value.

Dr. E. KAYE LE FLEMING (Wimborne) set out the point of view of a general practitioner who regarded all kinds of specialist treatment as primarily arising from the needs of the general physician and closely associated with and dependent upon his interest and coöperation. The relationship of the general practitioner with the radiologist was not so close as with the surgeon, but was more intimate than with specialists, such as the bacteriologist or pathologist, who gave their reports in writing. He advocated a closer personal contact, fearing that from the peculiar nature of radiology there was a danger of the tie becoming weakened or lost, to the disadvantage of all concerned. The science of radiology, especially radiotherapy, was technically outside the sphere of knowledge of the general practitioner. Its application was advancing so rapidly that the busy practitioner could not keep pace with it. It was, moreover, an expensive specialty, and unless the practitioner had good knowledge of the nature of a treatment and its probable efficacy he must hesitate to recommend it.

He then enumerated the main departments in which the general practitioner found the radiologist's help of particular value: bone injuries and displacements, the thorax, and the abdomen. X rays gave great assistance in locating fluid in the pleural cavity, and the skiagram of the heart, especially with a fixed method of procedure, added appreciably to the physician's knowledge. Records of the bismuth meal examination were sometimes too expensive, and a series of drawings from screening, with regional photographs, would often be sufficient. In treatment, he asked for information on the possibilities of X rays in Graves's disease. The general practitioner, he said, was keenly interested in the production of sterility in the female, and wanted to be able to tell a patient what the treatment would entail in the way of time and money. It was always important for the practitioner to know the cost- and time-factors in specialist treatment. He asked whether radiologists viewed with disquiet the giving of radiation to prevent conception on the request of a practitioner of repute. He himself had never in his professional experience felt the need of any amendment of the law in relation to sterilisation and abortion. Practitioners well knew the success of radiology in malignant skin disease, but were less familiar with its value in other conditions. He asked how far he could rely on a speedy cure of multiple warts on the hands or of patches of psoriasis. At present the treatment of carcinoma of the breast involved much cost and time; nevertheless, Dr. Le Fleming hoped that radium would some day displace the knife and greatly lessen the need for subsequent X ray exposure. In conclusion, he pressed for closer coöperation among radiologists in order to harvest their common experiences and results, and for a more systematic presentation of these results to the general practitioner, more particularly in post-graduate studies.

Dr. Franklin Wood (London) spoke on a series of 678 cases referred for X ray examination last year by the general practitioners of a certain area. They represented roughly, he said, the proportion of cases of the given types which required X ray examination in an average practice. Fractures came first with 388, and chest conditions came second; after these in order were arthritis, dental disorders, urinary disorders, and barium meal examinations. Pain, he said, was not always referred to the fracture, and diagnosis of cranial fractures required special skill. The radiogram would show every alteration in the heart and lungs. The condition of "radiological pneumonia" consisted of areas of congestion or consolidation and was seen after influenza; it corresponded to no physical signs or symptoms. Emphysema produced widening and asthma narrowing of the bronchi. He deprecated the use of softer rays in chest work, showing how the shadows of the heart and diaphragm obscured a large area of the lungs and blurred the apices. In pregnancy it was easy to make out the contour and diameter of the inlet and the character of the fœtus. He described methods of radiopelvimetry. In pseudo-pregnancy, he said, a radiogram of the abdomen gave useful reassurance. Lipiodol was valuable not only in the diagnosis of sterility due to obstruction of the tubes but also in its treatment; five patients out of eight treated had since become pregnant. Only the general practitioner could help the radiologist to see the late results of cases and therefore to correlate the clinical and the radiological findings.

Dr. H. G. Dain (Birmingham) said that except in gross lesions radiology could not be expected to give the whole diagnosis. The young doctor was apt to leave out the clinical examination. Radiology was most often useful for settling the general practitioner's doubts of his diagnosis, and often saved a second operation. When referring patients, the general practitioner should give the radiologist an idea of his difficulty, and in return the radiologist's report would be enlightened by this clinical knowledge. The chief uses of radiology were first of all its protective legal use to the general practitioner. Unfortunately no doctor was safe until the patient had been radiologically examined, though many of such examinations were clinically needless. Secondly, an enormous proportion of sprained ankles and wrists were really fractures. Here, although the X ray findings might not modify the treatment, they would affect the prognosis. Thirdly, X rays enabled the practitioner to watch the progress and healing of arthritic or tuberculous joints. In the fourth place, radiology was valuable for detecting infected foci; it had saved the removal of many teeth and was not, as some believed, a means of having teeth extracted. It gave a much more accurate idea of the patient's chances in a chest case, and with the new contrast media its use in the diagnosis of gall-bladder and kidney complaints was increasing. Difficulties in technique constituted one of the main drawbacks, and among the chief of these was variation in the angle at which the film was taken. In treatment one of its most outstanding successes was in ringworm. He was not satisfied with its value in Graves's disease, but deep therapy was effective in many malignant conditions. After mammary excision its results were disappointing.

Dr. W. B. Prowse (Brighton) said that the radiologist relied on the general practitioner to educate patients to appreciate the proper position of radiology and of the radiologist as consultant. The radiologist was a medical man practising in a technical field, not a technician. It was a misfortune that radiology dealt largely in pictures, the value of which in the public eye overshadowed that of the radiologist's intelligence. Patients were apt to consider the picture the chief part of their money's worth, as something which they could take to another doctor or osteopath. The radiologist's fees were not high compared with those of other specialists. More films of barium meal examinations were necessary, and they could not be replaced by screen drawings. In disagreement with Dr. Le Fleming he considered that radiological evidence was often useful in appendix cases. In deciding on treatment, the course should be adapted to the patient. The general practitioner should place all reliable data in the hands of the radiologist, preferably by interview.

Dr. Andrew Baxter (Alderley Edge, Cheshire) said that he always endeavoured to be present at the consultation with the radiologist. In his experience, post-operative radiotherapy in breast cancer saved the patient from secondary trouble. Radiology might save operation, as in intestinal obstruction in an old person where malignancy was suspected, but did not exist. He agreed with the full instruction of students, saying that the more a general practitioner knew of a specialty the more likely he was to consult a specialist. He urged a campaign in connexion with post-graduate work.

Dr. G. B. Batten (Dulwich) pointed out that a radiologist learnt to interpret only by long personal experience and experiment, and by following up patients to operation and autopsy. Dr. Stanley Melville had added much to radiological knowledge by attending the post-mortem examination of all patients who had died after examination for chest disease. Knowledge of the technique of radiology was, however, useless and dangerous in the hands of students and did harm by making them think of radiologists not as physicians and surgeons but as picture-takers. The general practitioner who purchased an X ray outfit was likely to become a menace to his patients.

Dr. J. F. Brailsford (Birmingham) held that the student should be taught what the radiograms meant. This would enable him to appreciate the nature of living organs as he could not by other means. There was no objection to the medically unqualified radiologist, who kept his job because he turned out first-class work. Radiotherapy could be extremely valuable in some cases of Graves's disease: patients might occasionally be burnt on the neck, but they were at any rate alive. It was impossible to cut down expense by limiting the examination, for scanty examination meant misdiagnosis. Contract work was apt to lead to mistaken economy in this direction. Clinical examination was becoming neglected. A negative report of a first examination did not necessarily mean that the patient was healthy. When the radiological appearances were typical in the absence of clinical signs, the general practitioner could not afford to neglect them.

Dr. **Roy Ward** (London) said that as early diagnosis was the most important single factor in the treatment of cancer, progress would be limited until there was a closer liaison between the patient, the doctor, and the treatment centre. At present patients failed to come for examination through ignorance or because they were afraid of cancer being diagnosed. The general practitioner must help centres to follow up their patients. The use of radiotherapy in menorrhagia was not dependent on a gross lesion. Operation was better than X rays for sterilisation, as it saved the ovaries. The choice of treatment in early operable cases of breast cancer had not yet been put on a satisfactory basis. For the thin, flat breast radiotherapy was better than surgery, but in the fat, pendulous breast it was difficult to distribute the needles properly and operation had advantages, especially if the incision were made over a wide area of skin.

Dr. C. H. C. **Dalton** (Ipswich) said that students should be instructed in what radiology could do. If instruction were deferred until the post-graduate stage, the great majority would not receive it. Every radiologist ought to serve at least one year as a resident before he took the diploma.

Dr. S. L. **Mucklow** (Cheltenham) suggested as one advantage of an interview between general practitioner and radiologist that analogies were often suggested with former cases.

Dr. **Le Fleming**, in reply, said that one great use of an X ray film was to impress the patient with the need for proper treatment. A disadvantage of post-operative radiation was that it concentrated the patient's mind on the possibility of recurrence.

Dr. **Webster**, also in reply, advised radiologists not to base their reports on the screening, because the film often showed appearances that the screen missed. This was especially true of fractures, where the legal danger came in. Modern safety apparatus, in which the current could not be passed until the filter was inserted, abolished danger to the skin. A new method was being perfected by which Graves's disease might be cured in a few weeks. The radiologist and the general practitioner could coöperate usefully in periodical medical examination for preventive purposes.

SECTION OF PUBLIC HEALTH

The president of the section, Dr. T. **Carnwath** (Ministry of Health), having briefly introduced the speakers, Dr. R. A. **O'Brien** (Beckenham) opened a discussion on

Immunisation in the Prevention of the Specific Fevers

in a paper dealing mainly with recent advances in the production of diphtheria prophylactics. The original toxin-antitoxin or toxoid-antitoxin mixtures with which so much of the earlier work was carried out were, he said, with the exception of toxoid-antitoxin floccules (T.A.F.)—a potent prophylactic which does not give rise to reactions—gradually being replaced by toxoid. Considerable use is also being made of alum-toxoid. Toxoid given in three or even two well-spaced doses has been found to make well over 90 per cent. of Schick-positive reactors negative within a few weeks. Except in very young children toxoid is apt to give rise to local reactions. Various ways may be adopted to circumvent these. Some give a full dose of 1 c.cm. of toxoid to children under 5 years of age. In the case of older children, the Moloney-Fraser intradermal sensitivity test with diluted toxoid is applied; negative reactors are immunised with full doses of toxoid, positive reactors with T.A.F. The so-called universal dose of toxoid (0·1 or 0·05 c.cm.) may be given to all children. Dr. G. Chesney of Poole injects all children with a small detector dose to identify those likely to suffer reactions. Discussing alum-toxoid, which although a powerful antigen tends to produce lumps and on occasion sterile abscesses at the site of injection, Dr. O'Brien said he was not wholly convinced that it will displace formol-toxoid. He thought however that, until it was possible to eliminate the pseudo element from antigens, the local swelling and general malaise which may follow the inoculation in sensitive people would not entirely disappear. There was no evidence that prophylactics made from the classical Park-Williams 8-strain did not give adequate protection against infection with the *gravis* strain of *C. diphtheriæ*.

Contrary to Dudley's experience at Greenwich, Dr. O'Brien had been unable to collect evidence in this country, or in the United States of America, that immunisation produced an increased carrier rate amongst the immunised who might therefore constitute a danger to non-immunes. About immunisation against scarlet fever there was little or nothing new to report. Scarlet fever formol-toxoids had been produced, he said, but, unfortunately, as the intensity of formalinisation is increased the toxicity is reduced and so also the immunising efficiency. Work was still being carried out but, so far, a satisfactory scarlet fever toxoid was not available. In the vaccine prophylaxis of whooping-cough, Dr. O'Brien considered that the work of Madsen in Scandinavia and Sauer in America offered considerable hope. He concluded by stressing the difficulties of the immunologist in obtaining access to adequate clinical material. Progress would be faster, he said, if under proper safeguards trial could be made of different antigens on large groups of children.

Surgeon-Captain S. F. **Dudley**, R.N. (Chatham), said that in his experience at Greenwich Hospital School negative Schick reactors might lapse to the extent of 10 per cent. in from six months to two years. Infection with the diphtheria bacillus, however, rapidly raised the antitoxic titre of the blood so that most of the cases of sore-throat in lapsed immunes were so trivial as to be clinically unrecognisable as diphtheria. He insisted upon the importance of not claiming that a school population was immune until there was evidence that the Schick tests had become negative. There could be no greater set-back to the progress of immunisation, he remarked, than the occurrence of severe or fatal diphtheria amongst those who were alleged to be immune. Since carriers were Schick-negative reactors, artificial active immunisation increased the number of those who, instead of developing clinical diphtheria following infection, became carriers. Captain Dudley believed that absolute immunity was not attainable, but active immunisation reduced morbidity, even following *gravis* infections, to a negligible figure. In conclusion he referred to recent important work by Colonel M. Perry and his co-workers at the R.A.M.C. College on T.A.B. vaccine. The Rawlings (1900) strain of *B. typhosus* had, with the lapse of years, lost virulence. It had now been possible to rejuvenate the strain and it had further been shown that vaccines prepared from virulent strains were no more likely to give rise to reactions following inoculation than were strains possessing only a low degree of virulence.

ULTRAMICROSCOPIC VIRUSES

Dr. Wilson Smith (Med. Research Inst., Hampstead) discussed the methods of immunisation available for those specific fevers which are caused by ultramicroscopic viruses. An acceptable method must be absolutely safe and produce no disturbance of health. It should be painless and result in a high grade of lasting immunity. There were several difficulties. No virus was known to produce an exotoxin, and thus those controlled trials with neutral innocuous toxin-antitoxin mixtures which were possible in the case of diphtheria were not feasible. Since viruses could not be grown upon lifeless media, pure sterile suspensions of known density, like T.A.B. vaccine, could not be made. Virus vaccines contained a little virus and a great deal of something else which might reduce, if it did not destroy completely, the efficiency of the vaccine. Owing to their very small size, it might be quite impossible to administer enough bulk of the dead virus to produce an adequate immunological response and, further, in the case of certain human diseases no other animal species had been found susceptible to infection by the causative virus. Nevertheless, important advances had been made during the last few years by indirect methods. Killed virus vaccines might produce no immunity or immunity which was slight and transient. The latter might be converted into solid immunity by giving subsequent doses of the living virus, possibly fatal to the normal animal. Formolised and carbolised vaccines had been extensively used for dog distemper and cattle plague and in human rabies were employed with great success. Field trials of similarly prepared yellow fever vaccine during an epidemic were unconvincing. These vaccines were unstable and might also be rendered quite useless if the viricidal chemicals were added in too great a concentration. Methods valid for one virus might be invalid for another.

In some cases, Dr. Smith thought, really killed viruses might be antigenically active and improved methods of concentration and purification might lead to their greatly extended use. By passage of the living virus through an unusual host it might be so modified as to produce in the human being a mild disease—e.g., vaccinia—but the modified virus was not sterile and hence scarification, even with its lack of precise dosage, was the only advisable means of administration. T. M. Rivers had cultured vaccinia virus in chicken embryo medium and had produced a satisfactory degree of immunity in 100 out of 118 infants. Culture vaccine might be injected intradermally without disadvantage. Further, W. D. H. Stevenson and G. G. Butler (The Lancet, 1933, ii., 228) had produced, he said, a highly potent and sterile vaccine by growing the virus on the chorio-allantoic membrane of the developing chick embryo. One egg would yield sufficient virus for the vaccination of 200 individuals. M. Theiler by the intracerebral inoculation of mice had prepared a modified strain of yellow fever virus which had been used for the inoculation of human beings. In this disease Dr. Smith thought it was preferable to adopt the method employed so extensively in animal diseases, such as dog distemper—i.e., the combination of virus with immune serum. The attack of yellow fever resulting from the injection of mouse-brain virus and convalescent serum together is mild, and extensive trials have shown that the immunising response is satisfactory. Dr. Smith mentioned briefly the use of convalescent serum in the prophylaxis of measles and its possibilities in poliomyelitis, chicken-pox, and mumps.

Dr. E. H. R. Harries (North Eastern Hospital) described some of the main indications for active and passive immunisation in the practice of the fever hospital. It was essential to immunise the staff against small-pox, diphtheria, scarlet fever, and, on occasion, against infections of the enteric group. Natural Schick-immune or lapsed artificially immunised nurses never, following infection with the diphtheria bacillus, experienced more than a highly modified and trivial attack which cleared up spontaneously. Immunisation of nurses with toxoid was valid against *gravis* infections. Natural Dick-immunes possessed solid immunity and did not contract clinical scarlet fever. Occasionally, artificial Dick-immunes appeared to lose immunity to an extent which permitted a clinical attack of the disease. Until the optimum range of skin test doses was known, active immunisation against scarlet fever in public schools with their high proportion of original Dick-positive reactors who might relapse could not be advised. Dr. Harries showed that the active immunisation of nurses against scarlet fever did not increase the incidence of streptococcal tonsillitis among them. Prophylactic *passive* immunisation against diphtheria, scarlet fever, and measles was of great value in obviating the spread of cross-infection in fever hospital wards. During the recent measles epidemic, when it was essential to maintain the maximum turnover, Dr. Harries had, by the injection on admission of a combined prophylactic of diphtheria and scarlet fever antitoxins contained in 5 c.cm. of concentrated serum, been able to secure the almost complete freedom of measles wards from these cross-infections. Analysis of some 900 consecutive cases so protected showed no instance of anaphylaxis and a late serum rash rate in about 9 per cent. It was further shown that sensitisation was negligible in frequency and degree. He discussed the value and dosage of adult immune measles serum.

Dr. C. W. Hutt (Holborn) gave statistical details of the progress of diphtheria immunisation in the large cities, headed by Birmingham with some 70,000 immunised children.

Dr. E. H. T. Nash reported the further progress of his immunisation campaign in Heston and Isleworth. He stressed the importance of propaganda.

Dr. Nancy Howell (Acton) had, during the last 18 months, immunised 6000 school-children including 69 per cent. of those in infants' departments. No cases of diphtheria had been admitted to hospital for some time. A gratifying result of a local anti-vivisectionist campaign had been a large immediate accession of children to the immunisation clinics.

Modern Sanatorium Treatment

In a paper read in his absence Dr. A. S. MacNalty (Ministry of Health) insisted upon the importance of early diagnosis and the proper selection of patients for sanatorium treatment. He noted a tendency to disparage sanatorium treatment and to exalt collapse therapy. There should be full coördination between the tuberculosis officer and the medical superintendent. Facilities for observation and hospital treatment were essential. Collapse therapy should only be carried out in really suitable cases. The criterion of temperature was all-important. Fever was the first indication of infection and should be met by absolute rest in hospital. Correct coördination between the hospital and sanatorium would obviate the admission of unsuitable cases to sanatoria. With the recurrence of activity the sanatorium patient should return to hospital. Careful study of the individual patient was essential. There must be a proper régime and facilities for prolonged stay. After discharge the ex-sanatorium patient should be secured as regards maintenance and should be kept under supervision for five years. Village settlements met these requirements.

Dr. F. G. CHANDLER (London) and other speakers also advised caution in the selection of cases for collapse therapy. It should not be lightly undertaken. The tuberculin era was recalled and fears expressed that another valuable mode of therapy might fall into disrepute as a result of indiscriminate use.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

A NOTABLE HEALTH SURVEY

A RECENTLY completed health survey of the State of New Mexico is of unusual interest from two points of view. In the first place, something over one-half of the population of this State consists of "Spanish-Americans"—the original Indian population inter-bred with Spanish conquistadores. The U.S. Census Bureau classifies them as white Americans, so that it is impossible from the mortality statistics published in Washington to distinguish between the rates for Spanish-Americans and for their "Anglo-American" neighbours. The New Mexico survey is the first extensive study of health among these original inhabitants of the south-west. In the second place, New Mexico has been for a generation the mecca of the American consumptive. Thousands have travelled from all parts of the United States to seek health among the New Mexico mountains. Many have died there leaving their families in the State. Many have recovered complete health and are now prominent bankers, lawyers, physicians, and merchants of the State. What has been the effect of this influx of active cases of tuberculosis upon the indigenous population? These interesting aspects of New Mexico's health problems, together with the fact that the bureau of public health in this State is administered on a civil service basis and is therefore reasonably efficient, induced many of the national health organisations to participate with the New Mexico Tuberculosis Association in the study.

The survey was made under the general direction of Dr. Carl Buck, field director of the American Public Health Association. It covered 18 out of 31 counties. Most of the work, however, was done in five counties carefully selected to include the different racial and occupational groups to be found in the State. In all, 4755 school-children received Mantoux tests, 4076 were examined for nutritional defect by the new A.C.H. method, 4000 had their eyes examined by experts from the National Society for the Prevention of Blindness. A careful search was made amongst the adult contacts of children giving positive Mantoux tests for open cases of tuberculosis. This was in addition to health examinations given at random in the adult population. More than 5000 adults selected at random had blood samples taken for Wassermann and Kahn tests, and in some cases for further serological study. More than 7000 premises were studied for sanitary facilities.

Mora County, populated almost entirely by Spanish-Americans, provided 1646 specimens of blood of which 1023 were from adults. The rate of syphilis among adults was found to be 8·0 per cent. The rate among children (under 17 years of age) was 2·0 per cent. No difficulty was experienced in tracing possible sources of infection. The cases found positive seemed not to be disturbed either that they had acquired the infection nor at the implications of having acquired it. An interesting account of this part of the survey has been published by Dr. Walter Clarke (Ann. Internal Med., May, 1934).

It is estimated that there are not less than 20,000 cases of active syphilis in the State. An accurate census, taken by the U.S. Public Health Service, of all cases of syphilis under treatment by the doctors and institutions of the State on Dec. 1st, 1933, showed 1011 cases actually under treatment. From this it follows that only 1 out of every 20 cases of syphilis in the State is under medical treatment. Judging from the findings in Mora County and from other available data, it is probable that the proportion of Spanish-Americans receiving treatment is even much less than the 1 in 20 average for the State.

Of adults examined at random, 8·6 per cent. were diagnosed either as having active tuberculosis or as suspicious. Among the families whose adult members were given physical examinations and found to be free from tuberculosis, 12·8 per cent. of the children gave positive Mantoux tests. On the other hand, in families in which active tuberculosis was found, 32 per cent. of the children gave positive reactions. Since tuberculosis was found to be three times as common among the Anglo-Americans as among the Spanish-Americans, one might easily suppose that more Anglo than Spanish children would show positive Mantoux tests. Remarkably this was not the case. The Anglo-American group of children showed 13·2 per cent. Mantoux positive, the Spanish-American 22·9 per cent. From this it appears that while the existence of open cases of tuberculosis in the family is an important factor in the spread of infection there must also be other factors of even greater social import. Will these other factors, whatever they are, also tend eventually to produce a large number of active cases among the Spanish-speaking people?

Public health officers in the south-west will watch with interest the research now being pursued in Cattarangus County, N.Y., where 500 children (300 reactors, 200 non-reactors) have been under close observation for a total of 1742 person-years. About half of the reactors have been followed into adolescence. Five of them are now negative to tuberculin. Only three have developed adult tuberculosis, two of them after continued or renewed exposure to positive sputum in the home, and the third after strenuous competitive athletic sports.

The survey of the sanitation of homes in New Mexico discloses primitive methods of waste disposal and water-supply among the Spanish-speaking people. Ninety per cent. rely on outdoor privies, while 4·2 per cent. have no system of human waste disposal at all. The Anglo-Americans enjoy only slightly better conditions, 71 per cent. using outdoor privies, while 15·9 per cent. have sewer connexions. Less than 10 per cent. of the privies in either group were found to be flyproof. In 15 per cent. of the premises surveyed (9 per cent. Anglo, 27 per cent. Spanish) there was a cesspool or privy, usually the latter, within 50 feet of the source of drinking water. Five per cent. of the Anglo-Americans and nearly 10 per cent. of the Spanish-Americans get their drinking water from streams or from irrigation ditches.

PARIS

(FROM OUR OWN CORRESPONDENT)

OF WHAT DO PARISIANS DIE ?

"OUR study presents, in brief, a promenade through a vast cemetery harbouring numberless Parisians who have disappeared during the three five-year periods, between 1909 and 1923." With this pictorial introduction, Dr. G. Ichok begins an analysis in the *Annales d'hygiène publique* of the main causes of death in Paris over three periods of equal length before, during, and after the war. As the population of Paris has shown little tendency to expand in the period under review, Dr. Ichok's uncorrected figures give a truthful enough picture of the relative importance of the various causes. It should be noted that the present tendency of many French doctors not to notify explicitly the causes of the deaths of their patients is hardly at all reflected in the present study which deals with Paris alone and with a period when ignorance had not yet become a studied policy. In fact, among a total of 672,137 deaths registered between 1909 and 1923 there were only 4917 not specified. Old age as a cause of death has increased slightly, but what is truly remarkable is the fact that there are three women for every man dying of old age. For this sex inequality Dr. Ichok has no explanation. Turning to deaths from suicide, he publishes a table in which nine variations of suicide are classified. The years 1914–18 distracted the would-be suicide, and the diminution survived the war. But there is one exception—viz., suicide by drowning—for which the figures for the three periods are 152, 108, and 305 respectively. On the other hand, accidental drowning is about 50 per cent. less common after 1919 than it was both before and during the war. Dr. Ichok is inclined to explain this paradox by assuming that many a suicide by drowning before and during the war was glossed over with the diagnosis *submersion accidentelle.* As for tuberculosis as a cause of death, we find the paradox of tuberculosis of the lungs declining from about 47,000 to about 33,000, while tuberculosis of the larynx shows a rise from 585 to 697 in the period under review. These opposite movements probably reflect fashions in notifications rather than any basic change in the behaviour of tuberculosis in these two organs ; and it would be getting nearer to the truth if the larynx were not dissociated from the lungs. With regard to the digestive system as the seat of fatal disease, it is noteworthy that the deaths from ulcer of the stomach numbered 354, 454, and 736 respectively in the three periods. In compensation for this abrupt rise is the diabetic mortality, the figures for which are 2312, 1846, and 1563 respectively.

MEDICAL PLETHORA AND A PROPOSED REMEDY

Dr. Portmann, senator and professor of medicine, has suggested a scheme for relieving congestion in the medical profession by the simple expedient of limiting the number of entrants. He has even prepared a draft of a law to this effect. According to the first article the Minister of Education will decide each year how many medical students may register as such, and how many may proceed from the first to the second year of their studies. According to the second article, the would-be medical student's inclusion in, or exclusion from, the list of candidates for a medical career would depend on the number of marks scored in certain examinations. They would, in other words, become competitive. In the *Concours médical* Dr. G. Duchesne deplores his colleague's lack of historical sense. For 50 years or more French doctors have not ceased to bewail the discomforts of a competition thrust on them by the overcrowding of the profession. In 1899 a prize was offered by a leading French medical journal for the best essay on this problem and its solution. Though Dr. Duchesne did not win this prize, his essay was published by the journal in question in 1900. Looking over it again, after an interval of 34 years, Dr. Duchesne was struck by the similarity of his scheme of reform to that of Prof. Portmann. But in the interval, Dr. Duchesne has lost confidence in the wisdom of such short cuts by discriminatory legislation. How, he asks, would it be possible to ascertain what is the number of doctors that would be necessary and sufficient for the needs of the community ? And how are doctors to be distributed in the many branches of their profession ? And what would happen if the limited number of students allowed to qualify as doctors were all to choose to settle in Paris, to the neglect of the rest of the country ? Nothing less than an arbitrary geographical distribution of doctors would solve this difficulty, a pretty solution indeed for a liberal profession !

SYSTEMATIC MEDICAL SUPERVISION OF MEDICAL STUDENTS AND NURSES

The extension of the system of periodical medical examinations to medical students and nurses is yielding instructive and sometimes disconcerting results. They are curiously similar, whether the examinations have been made in Yale, Oslo, Upsala, or Munich. At the Boucicaut Hospital in Paris, in the course of the past eight years, Dr. Courcoux and his colleagues have thoroughly overhauled more than 300 students and 380 nurses. A radioscopic examination of the lungs and heart was supplemented by a radiographic examination when there was any suspicion of tubercle. This comb-out not only yielded a couple of cases with tubercle bacilli demonstrable in the sputum, but also several cases of old pleurisy and radiologically demonstrable morbid changes in the lungs. The danger of the former to their neighbours, and the need for both groups to take special care of themselves, require no emphasis. But a more surprising result of these systematic examinations was the observation from time to time that the apparently robust, who passed the first examination with flying colours, collapsed soon afterwards with signs of acute tuberculosis. The by now classical skin tests of Hamburger and Monti in Vienna at one time lulled the world into a false sense of security with regard to the immunity of young adults to tuberculosis by their finding that 94 per cent. of the Viennese children between 11 and 14 were already tuberculin-positive. Dr. Courcoux and his colleagues have checked up these figures by tuberculin skin tests which they have included in their medical examinations of students and nurses during the past two years. They found that 23 per cent. of the students and 21 per cent. of the nurses were still cuti-negative. Yet most of these negative reactors came from urban, not rural homes. The precaution was taken of enjoining on these presumably susceptible persons the necessity for beginning their hospital work in services in which exposure to tuberculous infection would be least likely, but the repetition of the medical examinations, including skin tests, not only showed that more than half of them soon became cuti-positive, but also that several of them showed other and more disquieting signs of a recent infection. Commenting on these observations at a meeting of the *Société d'études scientifiques sur la tuberculose*, Prof. Bezançon stressed their importance in favour of the conception of tuberculosis as a contagious disease, at a time when there is a return on the part of many to Villemin's belief in tuberculosis as an expression of heredity.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A NEW PUBLIC HEALTH MEASURE

IMMEDIATELY before the adjournment of the Dáil the Minister for Local Government and Public Health introduced a Local Government (Amendment) Bill, the text of which has now been circulated. It contains provisions which empower the Minister to divide rural sanitary districts into two or more sanitary districts, each of which will rank as a county health district. The Minister will only take such action at the request of the county council. The county council will continue as the sanitary authority of each newly constituted district. Pending a statement from the Minister on the second reading of the measure its objects are not clear. Few of the counties in the Irish Free State are too large to be dealt with as a single area, and a multiplication of small sanitary districts may lead to unnecessary duplication of machinery. At present only two-thirds of the county areas in the State have medical officers of health, and a multiplication of areas is likely to delay still further this essential step in administration.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 25TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1964; diphtheria, 967; enteric fever, 51; acute pneumonia (primary or influenzal), 368; puerperal fever, 43; puerperal pyrexia, 116; cerebro-spinal fever, 15; acute poliomyelitis, 34; acute polio-encephalitis, 2; encephalitis lethargica, 6; dysentery, 5; ophthalmia neonatorum, 81. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Sept. 3rd–4th was as follows: Small-pox, 0; scarlet fever, 1158; diphtheria, 1409; measles, 353; [illegible]; puerperal fever, 19 mothers (plus 7 [illegible] lethargica, 269; poliomyelitis, 5; [illegible] At St. Margaret's Hospital there were 18 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 9 (1) from measles, 5 (0) from scarlet fever, 9 (1) from whooping-cough, 24 (3) from diphtheria, 54 (14) from diarrhœa and enteritis under two years, and 11 (0) from influenza.

The deaths reported during the week as due to diphtheria exceed the sum of those due to measles, scarlet fever, and whooping-cough. The fatal cases of diphtheria were widely distributed, no more than 2 being reported from any great town, but Portsmouth, Liverpool, Newcastle-on-Tyne, Sheffield, and Birmingham each reported 2 deaths. The two fatal cases of enteric fever outside London occurred at Hull. Birmingham, with 6, showed the highest deaths from diarrhœa, Leeds following with 5, Liverpool and Newcastle-on-Tyne with 3.

The number of stillbirths notified during the week was 249 (corresponding to a rate of 38 per 1000 total births), including 34 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. G. E. D. Ellis to *Victory* for R.N.B. and H. L. Douglas to *Pembroke* for R.N.B.

Surg. Lt.-Comdrs. E. B. Pollard, J. C. Souter, J. W. Cussen, R. G. Anthony, D. C. Drake, E. J. K. Weeks, and A. A. Pomfret to *President* for course; C. Keating to *Pembroke* for R.N.B., and to *President* for course; C. H. Birt to *Pembroke* for R.N. Hospital, Chatham, for course; W. F. Walsh to *St. Angelo;* T. W. Froggatt to *Godetia;* and J. C. Gent to *President* for course.

Surg. Lt.-Comdrs. (D.) L. B. Osborne to *Drake* for R.N.B. and A. W. Wallace to *Resource.*

Surg. Lts. B. S. Lewis to *Dolphin;* S. R. G. Pimm to *Victory* for Haslar Hospital for course; J. L. S. Coulter to *Centurion;* M. J. Brosman to *Fowey;* and S. R. G. Pimm to *President* for course.

Surg. Capt. P. E. Maitland, retired, has been awarded a Greenwich Hospital pension of £50 a year, from March 20th, in the vacancy created by the death of Fleet Surgeon R. H. Nicholson, retired.

Surg. Comdr. G. Kirker to *Drake* for R.M. Infirmary, Plymouth.

Surg. Lt.-Comdrs. (D.) H. E. Rose to *Defiance* and J. L. Edwards to *St. Angelo* for Malta Hospital.

Surg. Lt. D. B. Jack to *Bideford.*

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. H. A. M. Whitby to be Surg. Lt.-Comdr.

Surg. Lts. J. D. Simpson to *Vernon;* K. W. Martin to *Victory;* and W. D. M. Millar to *Victory* for R.N.B.

Proby. Surg. Sub.-Lts. D. Shute to *Pembroke;* P. M. Inman to *Effingham;* and J. Scott to *Drake* for R.N.B.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. R. C. Hallowes, D.S.O., retires on ret. pay.

Maj. L. T. Poole, D.S.O., to be Lt.-Col.

Maj. L. A. B. Moore relinquishes his commn.

REGULAR ARMY RESERVE OF OFFICERS

The undermentioned, having attained the age limit of liability to recall, cease to belong to the Res. of Off.: Lt.-Col. L. G. Gibson, Lt.-Col. F. L. Bradish, D.S.O., and Lt.-Col. W. C. Smales, D.S.O.

ARMY DENTAL CORPS

Maj. R. M. King to be Lt.-Col.

TERRITORIAL ARMY

Maj. S. J. C. Holden to be Lt.-Col.

R. M. Allardyce to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

The King has been graciously pleased to confer the Efficiency Decoration upon the undermentioned Officers under the terms of Royal Warrant: Lt.-Col. C. H. Budd and Maj. V. H. Wardle.

ROYAL AIR FORCE

Dental Branch.—Flight-Lt. G. A. Ballantyne is promoted to the rank of Squadron Leader.

INDIAN MEDICAL SERVICE

The appt. of the undermentioned officers is confirmed: Captains: B. M. Rao, A. N. Duggal, B. S. Sandhu, B. N. Khan, I. Bakhsh, C. H. Dhala, M. Ata-Ullah, S. Ahmad, C. C. Kapila, and V. M. Albuquerque.

The undermentioned appts. are made: To be Lts. (on prob.): W. J. Virgin, J. Brebner, H. W. G. Staunton, and J. D. Gray.

The undermentioned officers have vacated appts. in India: D.A.D.M.S.: Maj. R. F. Walker.

The undermentioned appts. have been made in India: A.D.M.S.: Col. L. V. Thurston, D.S.O., Brit. Serv. and Col. A. E. S. Irvine, D.S.O., Brit. Serv.

DEATHS IN THE SERVICES

The death occurred at Dymchurch, Kent, on August 31st, of Lieut.-Colonel Alban Anderson Meaden, R.A.M.C. (retired). Born in 1876, he was the eldest son of the late Rev. R. A. Meaden, and was educated at Highgate, St. Bartholomew's Hospital, and London University. He qualified M.R.C.S. in 1902, gained the Lawrence gold medal and scholarship in 1903, and entered the R.A.M.C. in 1904. He served through the European War and was created D.S.O. in 1916. He retired in 1931.

The death occurred on Sept. 3rd at Bexhill of Colonel Alan Edmondson Tate, C.S.I., C.M.G., R.A.M.C. (retired). He was the son of the late Rev. C. R. Tate, Rector of Trent, Somerset. Born in 1859 and educated at Merchant Taylors' and Bishop Stortford Schools, he qualified M.R.C.S. and L.S.A. in 1882. He entered the R.A.M.C. in 1883, became colonel in 1912, and retired in 1917. He served with the Burma expedition, 1886–89 (medal with two clasps), with the Chitral relief force, 1895 (medal with clasp), and in the South African war, 1899–1901 (Queen's medal with six clasps). He served in Mesopotamia and India 1915–19 and received the C.M.G. in 1916, and in 1919 the C.S.I. He was on the staff of the *commander-in-chief in India 1903–07* and hon. surgeon to the Viceroy of India 1912–17. He was also deputy assistant director-general of Army Medical Services at the War Office in 1908–09. He married in 1889 Zaidee, daughter of the late Mr. Frank White, of Loughborough.

CORRESPONDENCE

EXTRAPERITONEAL OVARIAN GRAFT CYST

To the Editor of THE LANCET

SIR,—In THE LANCET of July 14th (p. 74) Mr. J. S. Hall gave a very interesting account of cyst formation in ovarian grafts, and pointed out that very few cases have been recorded. Here is a recent case of my own.

Mrs. S., aged 36, was admitted to hospital on Dec. 21st, 1933, complaining of pain in the right iliac fossa, dysuria, frequent menorrhagia, and vomiting. She had had two previous operations, one in 1929 for dilation and curettage, the other in 1931 when the cervix was amputated. On examination the uterus was bulky and irregular, and there was a tumour in the pouch of Douglas. On Dec. 27th I opened the abdomen and found numerous adhesions surrounding an appendix which had been the seat of recent inflammation. The appendix was removed. The uterus contained a large number of fibromyomata, and there was an ovarian cyst on the right side the size of a grapefruit. The left ovary was also cystic. A panhysterectomy was performed, and three slices of the left ovary, each about 2 cm. long and 3 mm. thick, were transplanted into the rectus sheath on the right side. Convalescence was uneventful, and the patient was discharged on Jan. 20th.

I saw her again in February, when she complained of a painful swelling in the right rectus sheath. On Feb. 15th, under local anæsthesia, I removed one of the grafts. There was a small collection of blood-stained fluid about it, but no true cyst wall could be seen. The pathological report was: "The greater part of the transplant shows necrosis and loss of cell outline. There is a small area of proliferation of young blood-vessels into the centre, while the extreme edge of the tissue submitted appears to have escaped." On July 16th she complained of tenderness over two "lumps" in the right rectus sheath. They were about the size of pigeon's eggs, but she agreed not to have them removed when assured that they were not due to "cancer." She was entirely free from menopausal symptoms, but complained of some premenstrual pain over the tumours.

(I am indebted to Dr. R. A. Grant, medical superintendent of the Birkenhead Municipal Hospital, for permission to publish this case, and to Dr. J. M. Ritchie for the pathological report.)

The points of special interest are these: (1) The ovary from which the graft was taken was the seat of the disease. (2) Cyst formation occurred in all these pieces of graft. (3) There have been no menopausal symptoms. (4) The section showed, as is usual, some necrosis and new blood-vessel formation, but no definite cyst wall was seen. I believe, as Mr. Hall suggested, that these cysts are not true ovarian cysts but rather false cysts, the walls being formed by the surrounding tissue and the fluid by the rupture of Graafian follicles, the contents of which have not been absorbed. This theory is supported by the pathological findings, and it seems possible that the difference between the osmotic pressure of the liquor folliculi and the tissue fluids not only prevents the absorption of the liquor folliculi but may even cause an increase in the cyst contents. The fact that the ovary from which the grafts were taken was diseased does not affect the theory, and indeed it is probable that a diseased ovary is always used for transplantation, as otherwise the operation would not be required. It is, I think, unnecessary to remove these cysts unless the symptoms that they produce warrant it, and this is more especially so when menopausal symptoms have been avoided.

I am, Sir, yours faithfully,

H. A. KIDD, F.R.C.S. Edin.,

Deputy Medical Superintendent, Birkenhead Municipal Hospital.

August 23rd.

ACRIFLAVINE FOR SCHISTOSOMIASIS

To the Editor of THE LANCET

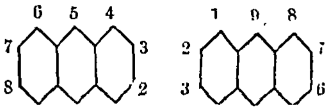
SIR,—Dr. A. C. Fisher's proposal in your issue of April 28th to treat schistosomiasis with acriflavine has stimulated many medical centres in Egypt to try it. To my surprise all of them treated their cases with trypaflavine with the idea that it is a synonym of acriflavine, and their failure may be attributed to this fact and to different dosage. Trypaflavine is a yellow powder with the formula 3 : 6 diamino-10-methylacridine chloride; acriflavine is a brick-red powder with the formula 2 : 8 diamino-10-methylacridine chloride. I am using a big bed-time dose of acriflavine—30 c.cm. of a 2 per cent. solution in water for adults weighing over 60 kilos, 15 c.cm. for youngsters and boys weighing 25–35 kilos, and 5 c.cm. for young children weighing 10–20 kilos. With these doses vomiting occurs in 40 *per cent. of* the cases but only ten hours after the dose has been given. Even very weak and debilitated patients stood this dose well; vomiting and some diarrhœa occurred, but there were no colicky pains or *jaundice*. Among 100 cases so treated over 50 per cent. are cured—ova absent or all dead. It is rather too early to speak about ultimate results. I am treating with encouraging results cases rejected by the Bilharzia Hospital as unfit for *tartar emetic* because of heart failure, liver cirrhosis and insufficiency, kidney troubles, or advanced anæmia. Some of the cases were treated in hospital, but the majority at home without special precaution.

Acriflavine is so quickly absorbed by the intestinal mucous membrane that little of it reaches the rectum where the worms may carry on. This led me to give rectal enemas, 300 c.cm. of a 1 in 500 solution every night, and it was when the drug was excreted in the urine curing bilharzia both of rectum and bladder. This route of treatment is suitable for cases which vomit badly and refuse oral treatment on this account. Recently I have been trying salol-coated or keratin-coated pills, with extract of gentian as the vehicle.

I am, Sir, yours faithfully,

M. A. EL MONEIM EL DIWANY,
Principal Medical Officer, Shebin-el Kom
July 30th. General Hospital, Egypt.

*_** Our correspondent is not correct in regarding trypaflavine as in any way essentially different from acriflavine. The confusion is due to the unfortunate fact that two systems of numbering have been employed to indicate the positions of substituted groups in the acridine molecule. The method of enumeration recognised by the B.P. 1932 is that given in Richter's "Lexikon der Kohlenstoff-Verbindungen," and shown in Formula I. An alternative method used—notably in France and in America (U.S. Dispensatory 1926)—is given in Formula II.



The variation in colour to which our correspondent refers may be due to the fact (of which we are informed by Messrs. May and Baker Ltd.) that commercial samples of these products consist of a mixture in varying proportions of the hydrochlorides of diamino-methyl-acridinium-chloride *and diamino-acridine*; which may also explain the differing therapeutic results.—ED L.

VACCINES IN PEPTIC ULCER

To the Editor of THE LANCET

SIR,—During the past few years the view that gastric and duodenal ulcers are due to an intestinal infection has slowly gained ground. Prof. D. P. D. Wilkie,[1] of Edinburgh, has demonstrated similar streptococci in the walls of the ulcer and gall-bladder in the same case. Dr. A. F. Hurst [2] has noted that duodenal ulcer is almost always associated with constipation. In the handbook of Vaccine Therapy,[3] issued by Parke Davis and Co., written by members of the Inoculation Department of St. Mary's Hospital, it is stated that long-chained non-hæmolytic streptococci are always present in cases of gastric and duodenal ulcer, and that these streptococci are not a normal inhabitant of the bowel.

Working with the vaccine prepared from these streptococci, during the past 18 months I have been able to demonstrate the fact that in a series of 22 cases the patients were hypersensitive to this vaccine —intestinal streptococci—to a remarkable degree. As a general rule a dose of 100 organisms is sufficient to cause a serious reaction. In fact, after a few of these reactions I have been compelled to commence with a smaller dose—20 or even 10 streptococci—and to make increases in this small initial dose every two or three days until improvement or reaction follows. Once there is a definite improvement the dose is cautiously increased until the improvement lasts for about a week, and the same dose is then administered at weekly intervals without any attempt to increase it unless the favourable response becomes shorter in duration. If a reaction follows any dose, a week is allowed to elapse and the next dose is drastically reduced, according to the severity of the reaction.

It is almost unbelievable to anyone who has not tried it that these doses should produce such marked results. One can only suppose that the result is produced by some kind of allergic response in a body sensitised to this particular bacterial poison. In actual practice the difficulty with these minute doses is not that they are without effect, but that they produce too violent reactions. The patients are, in my experience, hypersensitive—not only in the stage when an actual ulcer has been demonstrated by the X rays, but also before such ulcer can be demonstrated by the X rays, and after the ulcer has clinically healed. I have also found—as one would expect, according to the *infective theory—that in* the small number of cases I have tested, this hypersensitiveness to these intestinal streptococci is present in every case of *chronic appendicitis and cholecystitis*, and the common clinical complaints of "heartburn," "waterbrash," and so-called gastritis. The theory *that these are all local exhibitions of one underlying* streptococcal infection seems to be correct, and vaccine therapy is worthy of an extended trial with *a larger series of cases*.—I am, Sir, yours *faithfully*,

Tutbury, Staffs, August 20th. J. N. GALE.

PERSPIRATION SENSIBLE AND INSENSIBLE

To the Editor of THE LANCET

SIR,—In his first Lettsomian lecture, published in your last number, Dr. C. E. Lakin has defined insensible perspiration as "the escape of water vapour by osmosis through the skin. It is thought," he adds, "that the sweat glands play no part at all in this process." Hancock, Whitehouse, and Haldane (Proc. Roy. Soc. B., 1930, cv., 43) say that the loss of water by evaporation of water which has permeated through the general surface of the skin, and by evaporation or trickling down of sweat secreted by sweat-glands, does not necessarily correspond with what is known as insensible and sensible perspiration. They write :—

> "*In dry moving air or air at the low atmospheric* pressure of a high altitude, evaporation from the skin may be so rapid that when the sweat-glands are secreting very actively, or even to their utmost capacity, the general surface of the skin may be dry, so that all the perspiration is insensible, though far the greater part of it is due to secretion of sweat."

The condition of sweating was recently dealt with by Prof. B. A. McSwiney in his Samuel Hyde lecture to the Royal Society of Medicine (see THE LANCET, 1934, i., 641). It seems to me that Dr. Lakin's use of the term "insensible" perspiration is confusing. The term refers to the condition where there is no visible sweating; but under certain conditions even though the sweat-glands are secreting actively perspiration appears to be insensible.

I am, Sir, yours faithfully,

J. T. IRVING.

The School of Medicine, Leeds, Sept. 4th.

JOHN KNIGHT, SERJEANT SURGEON

To the Editor of THE LANCET

SIR,—The distinguished royalist, Dr. John Knight, is the leading figure in an historical paper which I am endeavouring to complete. Dr. Knight was made serjeant surgeon by Charles II. and appointed to be the King's principal surgeon. He was also commissioned by the same sovereign to be surgeon general of the Forces, and in that character did service in arranging for the care of the sailors wounded in the sanguinary naval battles fought off the East Coast in the second and third Dutch wars, and for the care of the sick soldiers engaged in the expedition to the Spanish Netherlands in 1678.

For the purpose of my paper I am seeking information bearing upon the history of the office of serjeant surgeon. An interesting article upon the serjeant surgeoncy appeared in the *Medical Times and Gazette* of Oct. 19th, 1867; oddly enough the article does not name Dr. John Knight among the holders of the office. It occurs to me that other articles upon the subject of the office must have been published from time to time and particularly upon occasions when distinguished surgeons in modern times have received the Royal Grant which appears to be conferred by letters patent.

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[1] Brit. Med. Jour., 1933, ii., 767.

[2] In Price's Text-book of Medicine, London, 4th ed., p. 582.

[3] Vaccine Therapy, Parke Davis and Co., 1931, p. 62.

The importance, the dignity, and the antiquity of the office alike suggest that some book may have been written about it giving, amongst other things, biographical material concerning the holders of the serjeant surgeoncy from early times.

I am, Sir, yours faithfully,

August 31st. E. M. C.

PANEL AND CONTRACT PRACTICE

Amendments to the Regulations

The Insurance Acts Committee has been considering the draft of the new consolidated edition of the medical benefit regulations, which contains certain amendments of existing procedure. The first of these deals with excessive prescribing. At present an insurance committee "shall make a recommendation" to the Minister about the withholding of money, even in cases where it has been found that excessive cost of prescribing has not been established. It is now proposed to insert after the word "shall," "if such decision is that excessive cost has been imposed upon the funds available for the provision of medical benefit." The second amendment concerns the procedure to be adopted when questions as to scope of the service are submitted to referees under the Act. The Ministry have agreed to the two modifications suggested at the last panel conference. The third amendment deals with arrangements for practice on retirement or death. The present wording states that "the representative of a deceased practitioner may *within the period for which the committee may permit the practice to be carried on by a deputy* require the committee to give notice, &c. . . ." It is agreed to alter the italicised words to "*within any period for which the committee shall have permitted.*" This is to make it clear beyond doubt that in the case of the death of an insurance practitioner the right to nominate a successor to the practice under this clause does not extend to a period of (say) two months, if no deputy has been appointed. The fourth amendment deals with the period within which, after fees have been accepted for services outside the Act, form GP 45 has to be submitted; at present only two days are allowed, and the time is to be extended to seven days. The fifth amendment concerns the arrangement for carrying on a practice during a practitioner's absence. At present the practitioner is required to inform the committee of the nature of any standing arrangements made with any other practitioner or practitioners, but does not require him to make such deputising arrangements. The new clause makes this quite clear: "A practitioner shall make all necessary arrangements for securing the treatment of his patients where he is unable for any of the causes mentioned above to give treatment personally, and shall inform the committee of any standing arrangements for that purpose."

Agreement on Certification

As a result of conferences up and down the country during the year, culminating in a central conference convened in March, agreement has been reached between approved societies and the Insurance Acts Committee on various points of difficulty in certifying incapacity. The agreement requires no alteration of regulations, but will only become effective through general adoption by both sides. The Ministry of Health, whilst appreciating the efforts of both sides to solve their difficulties, will insist on the proposals going to the consultative council for approval. The resolutions relating to the certification of pregnancy have already been set out in these columns (1934, i., 919); further resolutions on final certificates are now to be submitted to the conference. Postdating by three days is to be allowed in urban as well as rural areas; any alteration on certificates should be initialed to aid in detecting unauthorised alteration of dates. With regard to industrial diseases the resolution suggests that, although insurance practitioners are not required to decide whether an incapacitating disease is occupational or not, the note "? occupational" might be added to the certificate whenever the practitioner is of opinion that the character of the patient's employment may be a contributory or causative factor. For alternative employment the practitioner may communicate with the society intimating his opinion that the time was approaching when the member might be capable of some other kind of work, and asking what the society proposed to do in the matter. Of special interest is the suggested letter to be sent to doctors by secretaries of approved societies on the question whether a reference to the regional medical officer is desirable. The letter runs:—

DEAR SIR,

re — — — — — — — — — — — — — — — —

— — — — — — — — — — — — — — — —

Serial No. — — — — — —

The above insured person is a member of our society, and is receiving from you certificates of incapacity for work.

After a review of the case we are considering the reference of our member for examination by the regional medical officer, but in order to prevent unnecessary reference to this officer we shall be obliged if you will be good enough to inform us by return of post if a final certificate has been issued by you, or is likely to be issued by you in the next few days.

We realise that there is no obligation upon you to supply information to us, but it is hoped that in the interests of all concerned you will favour us with a reply.

To save you trouble we have made provision below for your reply, and we shall be grateful if you will use this and return the entire form in the enclosed envelope.

Yours faithfully,

Secretary.

Dr. — — — — — — — — — — — — — — —

— — — — — — — — — — — — — — — — —

I issued a final certificate on — — — — — — — — — — — —

Do you consider that any advantage would be gained by a reference to the R.M.O.? — — — — — — — — — — — — — —

Any other observations which you may wish to offer the society.

— — — — — — — — — — — — — — — — — — — —

— — — — — — — — — — — — — — — — — — — —

— — — — — — — — — — — — — — — — — — — —

Signature — — — — — — — — — — — — — —

The form of this letter, as also the previous resolution on alternative employment, appear at first sight to be so obvious a method of dealing with the situation that one asks immediately why it has not been adopted before. The answer is professional secrecy —and this difficulty is still present. The relationship of doctor and patient is such that without the patient's consent the doctor cannot answer such letters from an approved society. He can send a report, as he does now, to another medical man who is to give an opinion on a particular case, because those reports are confidential and are not disclosed to the society that is making the reference. The R.M.O.'s report is made to the society as a result of his own examination of the case, and with the help of the information conveyed in the medical attendant's report.

The report of the Insurance Acts Committee does not say whether legal opinion has been taken on the matter. It is obvious that if an insurance practitioner did communicate to an approved society facts about a patient without his consent which resulted in losing benefit, that quite clearly would be a breach of professional secrecy. On the other hand, these communications about patients might be answered in secrecy. But is it the I.A.C.'s considered policy to ask the conference to sanction secret communication about patients between the attending doctor and the society's officials? At the present time the difficulty is surmounted by marking the certificate confidential and handing it to the patient. This method could be adopted by sending to the patient the letter asking for the doctor's report. He would then know what was taking place, and by sending it himself to the approved society he would absolve the doctor from the breach of professional secrecy. With regard to the information sought by this letter, while it may help the society to know that a final certificate has been issued, few doctors and fewer patients will think there is anything to be gained by a reference. The patient may resent the suggestion that his doctor does not know all about his case, and will certainly dislike the implication that he is drawing sickness benefit when he ought to be back at work. The doctor in most cases will simply regard the reference as another report to write.

OBITUARY

ERIC DANVERS MACNAMARA, M.D. Camb., F.R.C.P. Lond.

Dr. E. D. Macnamara, who died in London on August 24th after a short illness, was educated at Peterhouse, Cambridge, where he took his B.A. in 1890, and at the Westminster Hospital from which he graduated L.S.A. in 1895 and M.R.C.S. in 1897. He then entered the medical department of the Royal Navy, serving in the Boxer rising, and being present at the relief of Peiping, for which he was awarded a medal with clasp. After five years service he returned to civil practice as medical registrar at the Westminster Hospital, taking the higher medical diplomas, and becoming assistant physician to the hospital, lecturer on medicine in the medical school, and finally dean of the school. During this period he was for a short time physician to Paddington Green Children's Hospital, and began the association with the West End Hospital for Nervous Disease which lasted throughout his life. In 1912, shortly after being elected F.R.C.P., he resigned his appointments at Westminster to succeed C. A. Mercier as physician for mental diseases to Charing Cross Hospital, and lecturer on psychological medicine in the college. He lectured also at Bethlem Royal Hospital, examined in psychology for the Conjoint Board and the University of London, and was a visitor for Middlesex under the Mental Deficiency Act. During the war he served in the medical department of the Admiralty as well as in the R.A.M.C. When increasing private work led him to give up his Charing Cross appointment he still remained active on the staff of the West End Hospital.

Although always more interested in psychopathology and psychiatry than organic neurology, Macnamara was nevertheless a very sound neurologist and diagnostician. His early experiences as assistant physician at Westminster had given him a wide knowledge of general medicine which enabled him to take a sound view of his special subjects and his individual cases. He was the author of no textbook but he was a frequent writer on neurological and psychological subjects to medical journals. He contributed to Latham and English's "System of Treatment" articles on morphinomania and insomnia; to the "Dictionary of Practical Medicine" articles on general paralysis, alcoholism, and functional insanity; and to Price's "Text-book of the Practice of Medicine" the article on psychological medicine. Everything he wrote had a distinction of style and an easy competence which made reading a pleasure.

Macnamara's personal qualities endeared him to his friends. Beneath his unassuming, somewhat reserved manner lay a charming personality and one of ready sympathy. "One could always," a colleague writes, "talk over difficulties with Macnamara, and be sure of common sense and helpful advice. Much of his work at the hospital was unobtrusive and entirely unselfish. He would serve on committees without demur, and on the committee of management of the hospital his services were invaluable. Although cautious in his decisions and somewhat conservative in his ideas, he had a vein of humour which belied his grave demeanour." A colleague in the R.N. medical service who remained a lifelong friend also testifies to the ability and sympathy which Macnamara possessed and devoted in such full measure to the department of medicine which he made his own. To an extensive knowledge of men and matters he added an enjoyment of life and an outlook on affairs which made him a delightful companion. It is, he adds, no exaggeration to say that Macnamara's name and work will long be remembered with gratitude by patients, students, and colleagues alike.

Dr. Macnamara married in 1904 Frances Mary, daughter of the late Dr. W. Simpson Craig, and sister of Sir Maurice Craig. He leaves a widow and two sons.

DAVID DUNCAN MAIN, F.R.C.P., F.R.C.S. Edin.

Dr. David Main, formerly principal of the Hangchow Medical Training College, who died at Buxton on August 30th, was an Ayrshire man, being born at Kirkmichael in 1856. At the age of 16 he entered a shipping business in Glasgow, but under the inspiration of Moody and Sankey he later decided to work as a missionary, and in 1877 he went to Edinburgh to prepare himself for the work by becoming a doctor. He qualified in 1881, and with his wife was immediately sent to Hangchow, where he served for 46 years. In spite of political disturbances, when the station either had to be closed down or work was carried on under military protection, when hospitals had to be given over to wounded and Red Cross services mobilised, Dr. Main created one of the finest medical organisations of the mission field. His work among the lepers, the opium addicts, and those suffering from tuberculosis led him to obtain the funds to found hospitals for patients suffering from these diseases. His care for the general health of the population called into being a home for incurables, convalescent homes, a maternity hospital, and a mental hospital.

He was eager that Chinese doctors and nurses should be trained, and so there were schools for midwives and dispensers, for male and female nurses, and in 1924 a gift of £10,000 from Lord Maclay enabled him to open the Hangchow Medical Training College, accommodating 135 resident students, with a staff of 25 foreign and Chinese teachers and doctors. At the close of his service there were 500 beds at the station instead of 16. Over 4000 in-patients and 60,000 out-patients were treated in a year, and over 1000 major operations performed. The institution was aptly called in Chinese the Hospital of Universal Benevolence. In 1926, at the time of Dr. Main's retirement, there were serious uprisings against foreigners, and in 1927 the whole work had to be closed down: but 18 months later it was possible gradually to open it up again.

Dr. Main's translations into Chinese include Whitla's "Dictionary of Treatment," Caird and Cathcart's "Surgical Handbook," and Playfair's "Midwifery." His years of retirement were spent in Edinburgh.

MEDICAL NEWS

Microchemical Club

The second meeting of this club will take place at Reading on Sept. 29th. At 11 A.M. the club will meet at the University for the discussion of papers, while in the afternoon a visit will be paid to the National Institute for Research in Dairying, Shinfield. The hon. secretary may be addressed at that Institute.

St. Mary's Hospital

A post-graduate course open to all medical practitioners will be held in this hospital from Friday, Sept. 28th, to Sunday, the 30th. The annual dinner for past and present students will take place in the library of the new medical school, adjoining the hospital, on Saturday, Sept. 29th, at 7 for 7.30 P.M. The chair will be taken by Dr. F. Montague Smith.

National Children's Home and Orphanage

Dame Janet Campbell, M.D., will open a new wing at the Sanatorium, Harpenden, on Saturday, Sept. 22nd, at 2.45 P.M. Sir Thomas Barlow, M.D., F.R.S., who has just celebrated his eighty-ninth birthday, is to take the chair.

St. George's Hospital

A post-graduate course for old students has been arranged by this hospital, and will be held from midday on Friday, Sept. 28th, till midday on Monday, Oct. 1st. Dr. W. Langdon Brown, regius professor of physic in the University of Cambridge, will deliver the inaugural address and present the prizes in the board room at 3 P.M. on Oct. 1st. The address will be entited "We have Reason to Think," and Sir Humphry Rolleston is to preside. The annual dinner will be held at Claridge's Hotel on Saturday, Sept. 29th, at 7.15 for 7.45 P.M., with Mr. W. Fedde Fedden in the chair.

Fellowship of Medicine and Post-Graduate Medical Association

A lecture-demonstration will be given by Dr. Clark-Kennedy at the Medical Society of London, on Tuesday, Sept. 11th, at 2.30 P.M., and will deal with chronic cough. On Sept. 18th he will lecture on hemiplegia. There will be a "refresher" course in medicine, surgery, and the specialties at the Westminster Hospital, from Sept. 17th to 29th. Other forthcoming courses include diseases of the chest at the Brompton Hospital, and proctology at the Gordon Hospital, both from Sept. 24th to 29th; diseases of children at the Queen's Hospital, Oct. 1st to 13th; dermatology at St. John's Hospital, Oct. 1st to 27th; an evening course on physical medicine at the St. John Clinic and Institute of Physical Medicine, Oct. 1st to 27th; cardiology at the National Heart Hospital, Oct. 8th to 20th; and medicine, surgery, and the specialties at the Metropolitan Hospital, Oct. 8th to 21st.

Kirk Duncanson Research Fellowship

The council of the Royal College of Physicians of Edinburgh will shortly award a whole-time fellowship of £200 per annum to a research worker. A part-time fellowship of £100 a year will also be awarded. Applications should be sent to the secretary of the college, 9, Queen-street, Edinburgh, not later than Sept. 15th. Particulars appeared in our advertisement columns last week.

Instruction in Contraceptive Methods

A lecture on the Theory and Practice of Contraception will be given to medical students and practitioners by Dr. Gladys Cox on Friday, Sept. 14th, at 6 P.M., at the Walworth Women's Welfare Centre, 153A, East-street, S.E.17. Practical demonstrations will be given on Fridays, Sept. 21st and 28th, at 6 P.M. and 7 P.M. These courses are given under the auspices of the Society for the Provision of Birth Control Clinics; they are open to students who have completed their gynæcological course and to medical practitioners, and to cover expenses a fee of 5s. is charged. Tickets for the lectures are to be applied for in advance, and those wishing to attend are asked to indicate as soon as possible the day and time they propose to attend.

A number of lectures on the theory and practice of contraception will also be given this autumn at the North Kensington Women's Welfare Centre, 12, Telford-road, London, W.10. The first lecture for post-graduates will be given by Dr. Cecile Booysen on Friday, Sept. 14th, at 5 P.M., and the first lecture for medical students by Dr. Helena Wright on Monday, Sept. 24th, at 5.30 P.M. Dates of demonstrations will be arranged at the lectures, and a fee of 5s. will be charged. Particulars of later lectures and other information may be had from the secretary of the clinic.

Medical Diary

SOCIETIES

PADDINGTON MEDICAL SOCIETY,
TUESDAY, Sept. 11th.—9 P.M. (Great Western [illegible] Hotel, Paddington, W.), Dr. L. Zeitlin: [illegible] Humour.

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION
SATURDAY, Sept. 15th.—10 A.M. (Town Hall, [illegible] Eastbourne), Dr. J. Alison Glover and [illegible] Griffith: Acute Streptococcal Throat Infection

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, [illegible]
MONDAY, Sept. 10th, to SATURDAY, Sept. [illegible] HOSPITAL, Vincent-square, S.W. Cou[illegible] Diseases. Afternoons,—MEDICAL SOCIETY [illegible] Chandos-street, Cavendish-square, [illegible] demonstration by Dr. A. E. Clark-Kennedy [illegible] Cough, at 2.30 P.M., on Tuesday, Sept. [illegible] OF TEACHERS: Individual clinics in [illegible] of medicine and surgery are available [illegible] of instruction, clinics, &c., arranged by [illegible] of Medicine are open only to members [illegible]

Appointments

BAILEY, R. H., M.R.C.S. Eng., has been [illegible] and Clinical Pathologist to the Child[illegible] the Westminster Hospital.

GIBB, C. DE W., F.R.C.S. Edin., Honorary [illegible] Throat Surgeon at the Gloucestershire [illegible]

MUENDE, I., M.B., B.Sc. Lond., Physician [illegible] Department at the Willesden General [illegible]

STRÖM-OLSEN, ROLF, M.D., B.Sc. Wa[illegible] Superintendent of the East Ham [illegible] Mental Hospital, Runwell, Essex.

Certifying Surgeons under the Factory [illegible] Dr. H. T. S. WISE (Chesham, Bucks) [illegible] (Loughton, Essex); Dr. A. Mel[illegible] Lincolnshire); and Dr. J. W. [illegible] Wigtownshire).

Births, Marriages, [illegible]

BIRTHS

FOX.—On August 30th, at Guern[illegible] Fox, M.D., of a daughter.

DEATHS

MAIN.—On August 30th, sudden[illegible] Main, F.R.C.S. Ed., F.R.C[illegible] China.

N.B.—A fee of 7s. 6d. is charged [illegible] Births, Marriage[illegible]

NOTES, COMMENTS, AND ABSTRACTS

OLD AGE*

By Horace C. Colman, M.D.

No satisfactory definition of old age has been produced. Whatever our age may be, we feel that old age is many years ahead; but for a working formula nothing is better than the Psalmist's three score years and ten. The patients I am thinking of are mostly those who have passed that milestone and yet show no signs of incapacitating disease. Even in these days of wandering after false gods or from consultant to consultant, there are still whole families whom we may regard as patients, our patients, well or ill. These old patients form no inconsiderable proportion of our visiting list, for among them are many who, though not obviously ill, like a regular visit from their family doctor; and that is a cause for thankfulness in every way.

You will agree with me that visits to old patients are often those you look forward to enjoying, and that from them you have learned a great deal not only medical, but of life in general. These people do not expect miracles, and most of them are very grateful for anything you do for them. All this applies to some in the humblest circumstances as much as to the better-off.

In my young days I learned something very valuable from a dear old lady. It was thought well that I should be introduced to her when she was not really ill. At the end of our consultation she said, "Well, I think you are quite a nice young doctor, but how times have changed! When I was younger, my doctor always felt my pulse and looked at my tongue." When we start practice fresh from hospital and a surfeit of acute illness we may very likely feel that old people and their ailments do not matter much; we may think that very little can be done for them, and that very little can be learned from them. It is well if we discover our error early.

One old lady once said to me, "You will find that your patients, when they get past 70, do not behave in illness in the way you would expect." Experience has proved this to be true. Do we not often see an old patient successfully go through an illness which by all the rules should have been fatal; or another resist for a long time the attack of some illness that ought rapidly to have proved fatal? On the other hand, some apparently trivial ailment has rapidly ended life, almost before one had realised that the patient was ill.

Patience and Prophecies

What can we learn from our old patients? Not all of them are dear old things. Some are very much the reverse, and from them we have to learn patience while they recite their tale of woe and their list of grievances. I have a vivid recollection of one old man who had been extremely successful in business, and who had everything that would make his declining years comfortable and happy. Yet he could find no pleasure in anything but reciting his woes, and seemed possessed by a grievance against Providence that such a man as he should be allowed to grow old. He kept a diary. I had to listen weekly to the details of his functions for the previous seven days, the amount of sleep, the exact hour at which he waked, and the biscuit he ate on waking, &c. Nothing would persuade him to take a favourable view of anything. One could only endure with patience and be thankful that one only visited him and did not dwell with him. A visit could not be terminated in less than 30–40 minutes, and one left feeling that at least that fee was earned.

One can learn also never to prophesy too confidently about the future, and to remember that mistakes in treatment are more easily forgiven than mistakes in prognosis. I had long promised an old man that, should he ask me if he were going to die, I would give a truthful answer. The test came when he was nearly 90 and ill with pneumonia, with a high temperature, respirations of 48, and pulse 140. To his question I replied that I did not think that he could possibly live 48 hours. The prospect pleased him so well that he improved from that hour, and he lived another four years. One can learn never to give up hope.

A question that is sometimes asked is whether we are ever justified in depriving a patient of hope. My own view is very seldom, unless it is obvious that adjustment of his affairs may save great distress to those who are left behind. But when we do feel justified in buoying up our patient's hopes, we should take some near relative into our confidence.

Even the most desperate cases recover sometimes. One old woman always protested when her daughter sent for me that it was nonsense sending for me as she was a done old hulk, and ought to be allowed to die. When sent for when she was 88 I found her with a complete obstruction. I told the daughter that an operation might save her life, and in any case would make her end easier. I said I thought she should have the chance, though I felt sure she would not take it. The daughter agreed with me, and was sure she would not take her chance. The old lady was lying in an old-fashioned box bed and was very deaf. There was nothing for it but to climb into the bed and practically to lie down beside her and bellow into her ear. Like a shot she replied, "Well, if you think so, you had better get it done at once." The daughter collapsed into a chair behind me, but I am glad to say the old lady spent 11 days in hospital and returned home to enjoy a year of complete comfort before influenza quietly removed her.

One can learn also to admire and respect an indomitable spirit rising supreme above poverty and real hard work.

An old woman had known poverty so extreme that she and her brothers and sisters gathered wool from the hedges for her mother to spin, and gleaned in the cornfields and kept the straw for their mother to make hats for them, married a widower who developed locomotor ataxia and went blind. She nursed that man, led him about, and in his old age catheterised him for seven years, kept pigs and hens, and took in washing, and for many years never had more than three consecutive hours' sleep in bed. To the end, which came when she was 87, she kept up a cheerful outlook on life that made friends for her all round, and I am glad to remember that she had a few years of peace and quiet after she buried that unfortunate husband.

Management of Old Age

Now let us turn to what we can do for our old patients. We can do a great deal, both in the way of helping them to keep well, and when obviously in their last illness by making their remaining life tolerable.

To illustrate my last point I may refer to an old woman who came into my hands lately. I found an emaciated patient with a very sore mouth, diarrhœa, a foul discharge, and ulcerated skin, altogether in utter misery. Examination showed a large rectal cancer and a recto-vaginal fistula. Douching and an ointment at one end and a simple treatment of the mouth, together with opium, to which I shall refer later, converted a miserable, querulous woman to a placid contented invalid, who died peacefully and without distress. Incidentally she developed a painless gangrene of a toe, and I have discovered that the two affections are often associated.

Old people, when they are feeling in good form, like to kick over the traces occasionally, and often the best thing we can do for them is to protect them from too fussy relatives. Even if they get thoroughly

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* A presidential address to the Forfarshire Medical Association at its June meeting, 1934.

ADDRESSES AND ORIGINAL ARTICLES

ARTERIAL HYPERTENSION *

BY O. L. V. DE WESSELOW, D.M. Oxon.,
F.R.C.P. Lond.

DIRECTOR OF THE CLINICAL MEDICAL UNIT AT ST. THOMAS'S HOSPITAL; PROFESSOR OF MEDICINE IN THE UNIVERSITY OF LONDON

AT the moment the question of the origin of the hypertensive states is the subject of keen controversy and of extensive research. There is an increasing tendency to limit the part played by the kidney in the production of a raised arterial pressure and even to deny that any form of hypertension is of renal origin: the possibility of an endocrine factor has assumed an increased importance with the recognition of the development of permanent hypertension in association with certain disorders of the ductless glands; with the advance of our knowledge of the chemical control of the circulation, there has been much search for possible pressor substances in the blood of the hypertensive patient; lastly hypertension has been experimentally produced in animals by the destruction of a reflex arc. The origin of the hypertensive states is, therefore, to-day a very living problem, and it is for this reason that I have ventured to review certain limited aspects of the question, fully realising that my review even of this limited field must be relatively superficial and incomplete.

The principal types of hypertension with which we meet are the hypertension of acute glomerulonephritis, the closely similar hypertension of the toxæmias of pregnancy, and essential hypertension, with its termination in malignant hypertension, essential hypertension being the commonest of all forms of raised blood pressure and its results the most disastrous. The term "essential" hypertension is in itself unsatisfactory, since it cloaks ignorance in apparent precision and leads to a unitary conception of a group of patients whose most prominent symptom, a raised blood pressure, has not yet been shown to be due to a single cause.

It is, perhaps, unfortunate that in all these forms of raised blood pressure albumin may appear in the urine, and that as a result of this, attention has from the first been focused on the kidney as a possible cause of the rise in the arterial pressure. What, then, is the present position of this renal theory of hypertension?

Compensatory Hypertension in Renal Disease

The earlier theories, which assumed that an increased resistance to the circulation of the blood through the vessels of the diseased kidney produced purely mechanically a rise in the general arterial pressure, we may regard as disproved; the vascular area occluded is too small and the interplay of the various vascular areas of the body too efficient to lead to any such result. Present-day advocates of a renal theory of hypertension would argue that defective renal function or a diminished circulation through the kidney in some way, possibly through the mediation of the nervous system, leads to a compensatory rise of general blood pressure which enhances the efficiency of the residual renal tissue.

As Verney[1] puts it "it would not be surprising to find that when this second reserve of the kidney was exhausted, and all the renal elements were receiving the maximum stimulus which under the circumstances could be given them, and yet were unable to cope with the work thrust upon them, there should be a call for external aid in the form of a rise of general blood pressure:" that is, when all the functioning glomeruli are in continuous activity, and when possibly by a shift of resistance from the vas afferens to the vas efferens the glomerular pressure has been increased to a level approximating that of the general arterial pressure, the only further compensating mechanism which can be called into play is a rise in the general arterial pressure itself. This rise will for a time compensate for the diminution in active renal units, but ultimately a further diminution in these units will upset the balance and death will then ensue. Such are Verney's conclusions from the study of the isolated kidney.

The possible mechanisms by which the compensatory rise in the general pressure might be evoked are three in number—firstly by means of some substance in the blood stream acting directly on the vessels and producing generalised vasoconstriction; secondly by some substance acting on the vasomotor centre, just as the respiratory centre is acted upon by an increase in the hydrogen-ion concentration of the blood; or lastly by afferent nervous stimuli to the centre.

That a rise in the general arterial pressure would be a valuable compensatory mechanism in advanced renal disease we may accept as probable; it remains to be determined whether such a method of compensation is actually brought into play to combat renal functional failure and, if this is the case, to what extent the various forms of hypertension are the result of primary renal damage. The fact that a mechanism of this nature would be of value is not a proof that it exists. It is of some interest to us that as long ago as 1881 Mahomed,[2] a member of this college, anticipated modern criticism of the renal theory of hypertension by suggesting that the renal lesion was not primary but secondary to the vascular changes.

His remarks on the condition which we now call essential hypertension, but which in his day was described as Bright's disease with red granular kidney, will bear repetition. "In the earlier stages the urine of what is known as chronic Bright's disease with red granular kidney is most commonly perfectly normal. Either chronic Bright's disease is not a renal disease, though it frequently gives rise to a renal affection, or else another disease must be recognised which constantly precedes and prepares the way for Bright's disease, and which may be called arterio-capillary fibrosis or any other name that may be proffered for it."

He was convinced that the changes in this type of Bright's disease were essentially vascular. More remarkable still, *considering the very inadequate means of investigation* then available, is the fact that he believed that in scarlatinal nephritis hypertension preceded the renal lesion. "In scarlatina," he says, "high pressure is recognisable in the pulse before, and experience has shown long before, any sign of failure or albumen appears in the urine."

To Mahomed belongs the credit of first suggesting that in essential hypertension the vascular lesion is primary, and that the same sequence of events occurs also in acute nephritis. The first of these suggestions had been generally accepted by the beginning of this century, but recent work has greatly strengthened the grounds on which it was based; the second remains in dispute.

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* The first Croonian lecture for 1934, delivered before the Royal College of Physicians of London on June 5th. Lectures II. and III. will appear in forthcoming issues.

Renal Changes in Essential Hypertension

It is unnecessary to discuss at any length the part played by the kidney in essential hypertension. The older investigators, basing their conclusions on the absence of albumin and casts from the urine of early cases, had already recognised that the renal lesion, when it occurred, was secondary. With the development of improved methods of investigating renal functional efficiency it has become increasingly evident that in the earlier stages of essential hypertension the function of the kidney is intact, and that it may remain unimpaired until death takes place from some extrarenal cause. Using such simple methods as the determination of the specific gravity of the urine under test conditions, or the urea-concentration test, the efficiency of the kidney is found to be unaffected, nor is there necessarily any accumulation of nitrogenous waste products in the blood of these patients. The more elaborate methods of examination, which are directed to determining the *amount* of functioning renal tissue, such as the urea-clearance test, or the Rehberg method of calculating the glomerular filtration rate by means of creatinine excretion, point to the same conclusion.

In a recent study by Weiss and Ellis[3] it was found that of 17 hypertensive patients 13 showed a urea clearance approximating to the normal. Though it might be argued that in the apparently normal cases the kidneys were in fact damaged, but showed a satisfactory clearance of urea owing to the presence of a compensatory rise of blood pressure, this was not actually the case. The authors were able to lower the blood pressure very considerably by means of sodium nitrite, and at the low pressure thus produced the clearance was in many cases as complete as it had been at the high. It follows that the renal function may be entirely intact in essential hypertension, and that the normal results obtained in functional testing are not merely the result of complete compensation for an impaired renal efficiency by a rise in the general arterial blood pressure.

Without going into further details we may, I think, regard it as proved that essential hypertension may exist in individuals whose renal function is completely unaffected. Clinically support is found for such a view in the predominance of cardiac failure and cerebral vascular accidents as causes of death in these patients, and in the relative infrequency of death from uræmia; in chronic glomerulo-nephritis, on the other hand, a disease in which the renal lesion has been present from the onset, the termination is almost invariably uræmia. Pathologically there is good evidence that even in long-standing cases of hypertension the renal vessels may sometimes be entirely normal, or may show no more definite degenerative changes than in individuals of the same age with normal blood pressures, and that the glomeruli and tubules may be completely unaffected. Modern nomenclature recognises the purely secondary nature of the renal changes in these patients by employing the term "ischæmic nephritis," and the term is justified by the fact that similar renal lesions are found in patients suffering from forms of hypertension in which there can be no question of a primary renal origin.

The Blood Pressure *in Acute Nephritis*

While in essential hypertension there seems to be every indication that the renal lesion is secondary to the vascular, in acute glomerulo-nephritis we have the classical example of the sudden development of hypertension in association with symptoms of renal damage. Volhard,[4] indeed, in his account of the disease, describes the rise of blood pressure as *the* pathognomonic symptom of diffuse glomerulo-nephritis. No one who had the opportunity of observing cases of "trench nephritis" during the war can fail to have been impressed by the close relationship of the raised blood pressure to the acute stage of the disease, and the rapid fall of pressure that occurred with the onset of diuresis and the subsidence of the œdema. Of 62 patients in whom I had the opportunity of making daily blood pressure observations, in 58 there was a close correspondence between the termination of the period of raised blood pressure and the disappearance of the dropsy as determined by weighing. A similar connexion between hypertension and œdema is found in the eclamptic toxæmia of the pregnant woman, a condition which presents a close similarity to acute glomerulo-nephritis. At first sight, then, these acute renal lesions would appear to offer a convincing proof of the connexion between renal damage and a rise in the arterial blood pressure.

If, however, we go further and examine the onset of the disease and the subsequent course of these cases we find that there is considerable cause for doubt. Unfortunately the sufferer from acute nephritis rarely comes under observation during the interval between the acute infection which almost invariably precedes the renal lesion and the development of the more obvious symptoms of the disease, such as œdema. The exception is the scarlatinal patient, and nephritis is at the present time a relatively infrequent complication of scarlet fever. We are dependent, therefore, for information as to the exact sequence of events at the onset of the disease on the fever hospitals and such chance cases as may come under our observation in the general wards.

As we have seen, Mahomed believed that hypertension in scarlatinal nephritis preceded the renal symptoms, but his observations, based on palpation of the radial artery and on sphygmographic tracings, cannot be regarded as in any sense conclusive. They have, however, been recently confirmed.

Koch,[5] following the blood pressure in cases of scarlet fever and making three observations daily, found that in almost all uncomplicated cases a rise of pressure occurred between the fourteenth and twentieth days. The rise of pressure was of variable duration, lasting in some cases only for 24 hours, and during the period of hypertension albumin and more rarely casts might appear in the urine, often only in a single sample. In some cases the hypertension might occur without any albumin in the urine, but albuminuria never appeared unless the blood pressure was raised.

Observations from the Stockholm Fever Hospital[6] have confirmed his finding that the rise in blood pressure precedes the appearance of albuminuria, though it is fair to mention that Steiner,[7] whose paper is only available to me in an abstract, while admitting the rise of pressure noted by Koch in the third week of scarlet fever, finds that when nephritis occurs as a complication of the disease the urinary changes precede the rise of blood pressure.

It is probable that in many cases of the common type of acute nephritis which follows infections other than scarlet fever, cardiovascular symptoms and œdema precede the appearance of albuminuria. Such patients are rarely seen until the disease is well established, and any primary rise of blood pressure is almost certain to be missed. Enough isolated observations are, however, on record to warrant the belief that in this type of nephritis also a rise in arterial pressure may precede the other symptoms of the disease.

Kylin,[8] for instance, taking daily blood-pressure measurements in patients recovering from acute tonsillitis, had the good fortune to meet with three cases complicated by acute nephritis; in all three the disease was of a mild type, but a rise of blood pressure of about 25 mm. Hg preceded the appearance of albuminuria and cylindruria. This hypertensive, pre-albuminuric stage of the nephritis lasted for three to four days.

Wickbom[9] records a case in which the systolic blood pressure reached a level of 160 mm. Hg with generalised œdema, headache, vomiting, and oliguria, but in which no albumin appeared in the urine, though red blood-cells were found on several occasions.

Nonnenbruch,[10] studying trench nephritis during the war, found that a rise in blood pressure without albuminuria is rare, but that such cases may occur, and that the systolic pressure may reach a level of 160 mm. Hg without renal symptoms. He also observed a group of patients in whom well-marked hypertension and moderate œdema were present, but in whom albumin appeared in the urine only on a single day, or even in a single sample.

I have recently had under observation an interesting case of this type.

The patient, a male of 26 years, had suffered from a sore-throat followed by a quinsy which had kept him from work for 14 days. Three days after resuming work general œdema developed, with slight dyspnœa on exertion; he was admitted to hospital on the third day of the disease, 17 days after the onset of the tonsillitis. He then showed slight generalised œdema, a blood pressure of 170/100, and moderate bradycardia, the pulse-rate at times falling to 56. In the course of 7 days the blood pressure gradually fell to 126/70, the œdema disappearing with a well-marked diuresis, which in one period of 24 hours amounted to 3800 c.cm.; the urine examined daily showed throughout no trace of protein to the salicyl-sulphonic test, nor were casts ever found in the centrifuged sediment. The blood-urea on the day following his admission was 39 mg. per 100 c.cm., and the urea-concentration and clearance tests were within normal limits, immediately after the termination of the hypertensive period.

The preliminary infection, the symptoms, and the course of the disease were in every way typical of acute nephritis, but the renal findings were entirely negative. Just as we meet with cases of eclampsia sine albuminuria, so we may also occasionally encounter cases of the condition which we call "acute nephritis," who show no urinary changes.

PRE-ECLAMPTIC TOXÆMIA

In addition to such fortuitous observations as I have detailed, it is permissible to turn to the routine blood-pressure determinations of the antenatal clinics for information as to the probable sequence of events. The renal aspects of the pre-eclamptic toxæmia of pregnancy and of eclampsia itself bear such a close resemblance to those of acute glomerulo-nephritis that conclusions drawn from the one condition may reasonably be applied to the other. The antenatal clinic has the unique opportunity of being able to keep its patients under observation for long periods even though no pathological condition is present.

That eclampsia may occur without albuminuria has long been known,[11] and most physicians with experience of the toxæmias of pregnancy have met with cases of pre-eclamptic toxæmia in which the rise of blood pressure and œdema have preceded the appearance of the urinary changes. A careful study of the symptoms of pre-eclamptic toxæmia has recently been published by Browne,[12] who paid special attention to the order in which hypertension, albuminuria, and œdema appear. Though his criterion of what constitutes a raised blood pressure in out-patient work is perhaps unduly strict his conclusions are important. He finds that a rise of blood pressure is the earliest sign of a toxæmia in 75 per cent. of his patients, and that œdema may precede the appearance of albumin in the urine or may occur without concomitant albuminuria. Though the data at present available are, owing to the nature of the case, somewhat inadequate, the observations of those interested in the sequence of events at the very onset of nephritis and eclamptic toxæmia are strongly in favour of the occurrence of a rise in the arterial pressure before the appearance of the urinary changes.

NATURE OF THE RENAL LESION IN ACUTE NEPHRITIS

What then is the relationship between the rise of pressure and the renal lesion in nephritis? Any attempt to answer this question entails a short discussion of the existing theories of the disease, theories necessarily based upon pathological and clinical observations in the human subject, since up to the present an acute nephritis resembling that seen in man has not been produced experimentally in animals.

It is generally agreed that the disease follows an infection, after an interval, and that the pathological changes found in the kidney of the patient dying during the early stages of the attack are predominantly vascular. The glomeruli are swollen, and the capillary loops abnormally rich in nuclei, partly owing to endothelial proliferation, partly to leucocytic infiltration. The capillaries of the glomerular tuft contain few or no red blood-cells: their lumen may be dilated, but is packed with proliferated endothelial cells.[13 14] The changes in the eclamptic kidney, as described by Baird and Dunn,[15] are closely similar: the capillaries are empty of red cells and occluded by endothelial proliferation; leucocytic reaction is absent.

Volhard, who has had the opportunity of examining many samples of renal tissue obtained during decapsulation of the kidney in the acute stage of the disease, finds that the vasa afferentia of the glomeruli are patent and contain no blood, that the interlobular arteries contain hyaline thrombi with few red cells, while the large arteries are still full of blood. He insists that the failure of circulation through the loops is not caused by endothelial proliferation, since the lumen of the capillary may be patent but empty; the ischæmia of the loops is to be attributed to arterial constriction above the level of the vas afferens, and results from functional spasm and not from any actual mechanical obstruction. The glomerular changes are produced by the ischæmia.

He finds that, using suspensions of red blood corpuscles or Indian ink, and an injection pressure less than the systolic pressure observed before death, it is possible to inject all the glomeruli of a nephritic kidney, which previously were empty of blood, and concludes that the bloodlessness of the glomerular capillaries is not due to blocking of their lumen by an endothelial proliferation but to a vascular spasm. Hayman,[16] who perfused kidneys with Ringer's solution or gum acacia at varying pressure, found a marked reduction in the perfusate per gramme of tissue per minute in two cases of acute glomerulo-nephritis as compared with the normal kidney. He gives no data as to length of time which had elapsed from the onset of the disease, and it is arguable that, even though the initial absence of blood from the capillary is purely the result of spasm of the vasa afferentia, endothelial proliferation may at a later stage produce some degree of mechanical obstruction to the blood flow through the organ.

That vascular spasm, even of relatively short duration and in no way limited to the renal vessels, may lead to serious damage to the glomeruli is well shown by the case of the pharmacologist Bornstein, who administered to himself intravenously the large dose of a milligramme of adrenaline. After a period of collapse red cells, granular casts, and a large amount of albumin appeared in the urine, and a residual albuminuria persisted for some weeks.

Volhard originally assumed that a generalised vascular spasm occurred, due to unknown but entirely extrarenal causes; in this the renal vessels participated and glomerular ischæmia resulted. In some unknown manner the general vasoconstriction was to be attributed to the initial infection. Since his collaborator Bohn has claimed to have demonstrated pressor bodies in the blood of patients suffering from acute nephritis, bodies which on other grounds he believes to be derived from disintegrating renal tissue, Volhard has changed his point of view, but it will be simpler to consider his present position in connexion with the question of pressor substances in the blood of hypertensives.

A more obvious explanation of the absence of blood from the glomerular capillaries and of the changes in the appearance of the tufts is that the blood flow is obstructed mechanically by changes in the capillary walls.

> Fahr,[17] who maintains that the hypertension of acute nephritis is renal in origin, believes that the essential lesion of the disease is a capillaritis of the vessels of the glomerular tuft, which may extend into the vas afferens. Any circulatory toxin of a colloidal nature would presumably become concentrated in its passage through the tuft and would exercise its injurious effect upon the delicate vessels of the glomerulus. He believes that the changes in the glomerular capillaries are of an inflammatory nature rather than the result of ischæmia due to spasm of the afferent arterioles, and that the ultimate bloodlessness of the glomeruli is the result of obstruction to the blood stream due to endothelial proliferation, and develops hand-in-hand with that proliferation. The absence of blood from some segments of the vas afferens is due to the same cause, while the apparent patency of the lumen of glomerular capillaries, from which blood-cells are absent, is an artefact due to shrinking of the endothelium during the process of fixation. The microscopic findings in certain cases of acute nephritis which have terminated at a very early stage of the disease are believed to afford support for this view.
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> Hückel,[18] who examined the kidneys of a patient dying within 30 hours of the onset, found the glomeruli in general well filled with blood; where they were poorly filled endothelial proliferation and narrowing of the lumen were present; the capillaries were never empty yet open, as described by Volhard. It must be admitted that the diagnosis of this much quoted case is doubtful; the kidney changes were minimal, though albumin and casts were present in the urine, the non-protein nitrogen of the blood was not appreciably raised and, though convulsions had occurred, the systolic blood pressure was only 110 mm. Hg.
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> Dietrich,[19] during the war, obtained specimens from cases of presumed nephritis which had died suddenly very shortly after the onset of the disease: the glomeruli tended to be bloodless, but individual loops of the glomerular capillaries varied in the amount of blood which they contained; in the empty loops the lumen was apparently obliterated by endothelial proliferation, and definite leucocytic infiltration of the tufts was present. If spasm of the vas afferens is the cause of the absence of blood from the glomerular capillaries, all the capillary loops should be equally affected, and not isolated segments, as found by Dietrich.

The interpretation of the post-mortem appearances in the kidney of acute glomerulo-nephritis is obviously difficult, and it is highly doubtful whether studies of this nature will lead to conclusions which will command general assent. The essential problem is the cause of the absence of blood from the capillary loops. A generalised arterial constriction must be present to account for the raised blood pressure; the observed narrowing of the retinal arteries in severe cases, and possibly the pallor of the skin, may be taken as evidence of such a generalised spasm. The disputed point is the relationship of the vascular constriction, with the resulting rise of blood pressure, to the renal lesion. Is the arterial spasm secondary to glomerular damage and compensatory in nature, or are the glomerular changes themselves secondary and the result of ischæmia? In default of any agreement as to the significance of the pathological findings, the answer to this question must come from clinical observation of the course of the disease and from experimental work.

If hypertension does in fact precede the albuminuria it would seem that a capillaritis of the glomerular loops can hardly be accepted as the primary lesion in acute nephritis. The delicacy of the glomerular epithelium is such that its permeability to protein seems to be very readily affected; exercise, exposure to cold, venous congestion, fever, and many other causes all lead to such changes in the glomerulus as to permit albumin to pass into the urine. It is difficult to believe that the first symptom of a disease consisting essentially of a lesion of the glomerular capillaries would be other than albuminuria. Hypertension, if secondary to the renal lesion, should appear after the albuminuria, or at most simultaneously with it, but should certainly not precede the urinary change. The available data suggest, however, that the blood pressure may rise before albuminuria appears. Again, if we assume that the rise of pressure is secondary to the renal damage, and compensatory, it is difficult to see by what mechanism it is evoked. In the type of renal lesion in which there would seem to be good reason to suspect that the hypertension is secondary, gross accumulations of the nitrogenous waste products are present in the blood. In acute nephritis such accumulations are by no means the rule, and in the hypertension of eclamptic toxæmia are almost always absent. The other possibility that occlusion of the renal vessels produces by some reflex mechanism a compensatory rise in the general arterial pressure may be discounted. Occlusion of a relatively small vascular area does not of itself produce hypertension, nor does the complete occlusion of the renal circulation in bilateral cortical necrosis lead to a raised arterial tension. Eppinger[26] in animal experiments has given an apparently decisive demonstration of the effects of occlusion of the glomerular circulation upon the cardiovascular system.

> He shows that in the kidney damaged by cantharides or sublimate there is almost complete obstruction to the flow of blood through the capillaries of the glomeruli: it is no longer possible, as in the normal kidney, to inject the glomeruli by means of Indian ink introduced into the left auricle. Measuring the blood flow through the renal and mesenteric veins, he finds that the flow through the damaged kidneys falls to about one-seventh of the normal, while the flow from the mesenteric vein increases by a proportionate amount. A local shunt of the blood stream occurs and the arterial blood pressure in the brachial shows no appreciable rise. Albumin, red cells, and numerous glomerular casts appear in the urine.

In these experiments we have a condition approximating to the obstruction of the glomerular circulation which is assumed by Fahr to result from glomerular capillaritis in acute nephritis, but no compensatory rise in general blood pressure is evoked.

A UNIVERSAL CAPILLARY LESION ?

While Fahr suggests that the lesion in acute glomerulo-nephritis primarily affects the capillaries of the renal glomeruli, Kylin believes that the capillary lesion is not limited to the kidneys, but involves all the capillaries of the body. The generalised lesion is assumed to be responsible for the subcutaneous œdema; in the glomerular capillaries it leads to the appearance of albumin in the urine; further, it evokes a spasm of the arterioles with a resulting rise of blood pressure. The œdema, albuminuria, and hypertension of eclamptic toxæmia are the result of a lesion of similar type, though produced by a different toxin. The attraction of this theory of a universal capillary lesion is the explanation which it appears to offer of the œdema of acute nephritis, and the linking-up of the subcutaneous œdema with the albuminuria, as the expression of a generalised increase in capillary permeability.

The grounds on which Kylin bases his theory are the alleged rise of capillary pressure in acute nephritis, the high albumin content of the subcutaneous œdema fluid, and the microscopic appearance of the skin capillaries. He compares the action of the hypothetical toxin to that of histamine, and suggests that like histamine it may produce in weak concentration a capillary dilatation with increased permeability, in stronger concentration an arteriole constriction with associated hypertension. The comparison is somewhat unfortunate, since it has been pointed out that, while in rodents arteriole constriction may be the predominant effect, in the human being both arterioles and capillaries dilate, and it is well known that in man histamine produces a fall of blood pressure.

With a generalised increase of capillary permeability, concentration of the blood may be expected to occur, the loss of plasma volume in histamine shock sometimes amounting to as much as 40 per cent., with a corresponding increase in the hæmoglobin value. No similar concentration of the blood has been shown to occur in acute glomerulo-nephritis. Nonnenbruch,[21] it is true, reported a high red cell count in certain cases of trench nephritis, but his patients appear to have been in the nephrotic rather than the acute stage of the disease. My own experience of trench nephritis was that the hæmoglobin was invariably low early in the disease, probably owing to the presence of a true anæmia. The use of the more accurate vital red method of estimating the blood and plasma volume indicates that in acute nephritis in civilian life the plasma volume is approximately normal for the patient's non-œdematous weight, the total red cell volume being diminished.[22] In eclampsia and pre-eclampsia, in which Kylin also postulates a generalised capillary lesion, I have found no evidence of any actual concentration of the blood. In 14 cases, most of them at a very early stage of the disease, the average volume of plasma per kilogramme of corrected, non-œdematous weight was 52 c.cm. against 56 in normal, pregnant controls and the corpuscular volume, as determined by hæmatocrit, 37 per cent. Concentration of the blood, such as might be expected to occur with a general increase in capillary permeability, does not therefore appear to be present in these two conditions.

The most convincing proof of an altered capillary permeability would be a high protein content of the fluid exuded into the tissue spaces. It is unfortunately difficult to obtain data as to the actual composition of the œdema fluid in acute nephritis; in contrast to the nephritic, in whom large quantities of œdema fluid may be readily obtained from the subcutaneous tissues, puncture of the skin of the patient suffering from acute glomerulo-nephritis rarely yields enough fluid for analysis. Kylin quotes Beckmann's[23] figures as showing that a high protein percentage is characteristic of the œdema fluid of acute nephritics. This author, studying the œdema fluid in various types of dropsy, found that in nephrosis the protein content is approximately 0·1 per cent., while in acute glomerulo-nephritis the fluid contains from 1·0 to 2·5 per cent. of protein, and in cardiac dropsy about 0·5 per cent. These figures for the protein content of nephritic œdema fluid do not appear to have been confirmed by other workers.

Van Slyke[24] in two cases gives a protein content of 0·1 per cent., and in œdema fluid from a patient of my own, in whom a considerable degree of cardiac failure was present, 0·35 per cent. of protein was found. Kylin[25] himself has recently reported similar values in acute nephritis and in nephritis of pregnancy—values approximating closely to those met with in cardiac dropsy. Both plasma volumes and protein content of the œdema fluid give therefore no clear indication of grossly increased capillary permeability. In acute nephritis we find no such reduction of plasma proteins and of plasma osmotic pressures as occurs in nephrosis, and is believed by some to account for the œdema of that condition. In default of other explanation, it is suggested that the œdema of acute nephritis is cardiovascular in origin. Cardiac embarrassment is certainly a noticeable feature of many cases of acute nephritis, and definite cardiac failure may occur at levels of blood pressure which are tolerated without appreciable discomfort by the essential hypertensive, whose cardiac muscle is given ample time to hypertrophy owing to the slow rate at which the increase in the arterial tension develops. There can be no doubt that, during the process of recovery, the disappearance of the œdema and the fall in blood pressure are closely related.

Kylin also insists that the rise of pressure in the capillaries, as determined by his compression method, is evidence of a capillary lesion. The rise is stated to be present both in the frankly developed nephritis and in the pre-albuminuric stage of the disease, sometimes preceding the appearance of albumin in the urine by a week. Mufson,[26] by a similar method, has also found high capillary pressure in acute nephritis and in certain cases of pre-eclamptic toxæmia, the rise in his patients being closely associated with the presence of œdema. The mechanism of this rise, despite the presence of the arteriole constriction which the capillary lesion is assumed to evoke, is obscure. The compression method of determining capillary pressure is by no means universally accepted, and it is possible that the apparent rise of pressure in acute nephritis is merely the result of changes in the elasticity of the skin, which are known to be present in this disease, and may even precede the appearance of clinical œdema. As to the constancy of morphological changes in the skin capillaries, as demonstrated by the capillary microscope, there is at present no agreement.

Though the hypothesis of a generalised capillary lesion offers a tempting explanation of the œdema of acute nephritis, and correlates the subcutaneous œdema with the urinary findings, it would seem that definite evidence of the presence of such a lesion is still to seek. There is also no proof that the lesion of the capillaries would, as suggested by Kylin, lead to arteriole constriction and the rise of blood pressure which is the phenomenon of the disease with which we are especially concerned. If the albuminuria is to be taken as the index of the time at which the capillary lesion makes its appearance, on this theory again albumin should appear in the urine coincidently with or before the rise in blood pressure, but Kylin himself does not claim that this is the case.

Inadequate as is the available evidence, it would seem that the existing data suggest that in acute nephritis the rise in blood pressure precedes the renal damage, and that the generalised vasoconstriction is more probably a factor in the production of the glomerular lesion than a consequence of that lesion. The very fact that all attempts at experimental production of the disease by injection of bacterial toxins have up to the present failed, is against the belief that in acute nephritis we are dealing with a primary toxic capillaritis of the glomeruli, and that a lesion of this type is responsible for the other features of the disease, including the hypertension. It is undoubted that in man the infection precedes the appearance of acute nephritis, but some other factor than toxins derived from the infective focus must apparently be invoked if the typical glomerular lesion is to be produced. It is possible that this factor is glomerular ischæmia produced by arterial spasm of unknown origin.

The Blood Pressure in Persistent Nephritis

In its later stages the course of acute glomerulonephritis shows the same lack of correlation between the renal lesion and the level of the blood pressure which we find at the onset. At the termination of the acute stage the fall of pressure is often abrupt; I have seen a pressure of 180/100 fall to 98/60 in 72 hours. The ultimate level of the blood pressure is often for a time abnormally low. There is, however, no evidence that this rapid fall of blood pressure is accompanied by an equally rapid resolution of the renal lesion. As is well known, albuminuria and microscopic, if not macroscopic, hæmaturia may persist for months after the termination of the hypertensive period, even though eventually complete recovery occurs. The restoration of full renal function is also slow and gradual. The concentrating power of the kidney, as estimated by the urea-concentration test, is still impaired at a time when the blood pressure has returned to a normal level; the urea-clearance test shows a similar lag. Holton,[27] using the creatinine-clearance test, and the concentration test of Volhard, notes this slow recovery of efficiency, and finds that the blood pressure has fallen to a normal level long before the renal function is completely restored. Such findings are not easily explained on the assumption that the hypertension is compensatory for, and secondary to, a damaged renal efficiency.

The course of the blood pressure in those cases in which complete recovery does not occur and which, often after many years, terminate in uræmia is also of interest.

During the so-called second stage of chronic glomerulonephritis, before renal inadequacy has developed, the blood pressure may remain at a normal level though the lesion is active and progressive. In Volhard's series of 342 cases in the second stage of the disease, 159 showed blood pressures below 140 mm. Hg. This absence of hypertension is especially noticeable in some of those patients who pass through a period during which the symptoms are suggestive of nephrosis, heavy albuminuria, and extreme œdema, without nitrogenous retention. In such cases no evidence of cardiovascular change need be present, and in default of a history of acute nephritis the diagnosis from true nephrosis may be impossible. Later, with development of the third stage of renal inadequacy, the œdema may clear, the quantity of albumin passed in the urine may diminish, and the blood pressure rise. Hypertension is, indeed, an almost invariable feature of the third stage of the disease, the stage characterised by a grossly defective renal function. For this particular period of hypertension we may, in default of any other explanation, assume a renal origin; it is the stage of chronic glomerulo-nephritis in which the number of functioning glomeruli is enormously diminished, and in which the failure of function makes itself evident by the accumulation of waste products in the blood. In such circumstances an increase in the filtration pressure is the only mechanism which will compensate for the diminished filtering surface, though we have as yet no knowledge of the method by which the compensatory hypertension is evoked.

We have, then, in the course of glomerulo-nephritis, two periods of hypertension which may be separated by an interval during which the blood pressure is within normal limits. The hypertension of the acute stage is probably not of renal origin; its cause is at present unknown. The hypertension of the later stages is associated with evidence of functional failure of the kidney, and may be regarded as compensatory and as the result of the renal lesion.

The most convincing evidence that such compensatory hypertension may occur is to be found in the raised blood pressure of polycystic disease of the kidney. Though doubt has been cast upon the existence of hypertension in this disease, a rise of blood pressure is certainly present in the majority of the patients during the later stages.

In a small series of 14 cases which I have collected, eight patients showed definite hypertension during life, and in three others hypertrophy of the left ventricle was present post mortem; two cases were only seen in an advanced stage of uræmia, and at that time showed a normal blood pressure, possibly as a result of cardiac exhaustion: in these two patients no post-mortem was obtained. In one case only, a male of 32 years, the blood pressure was normal at a time when the patient was in vigorous health and showed no evidence of renal inadequacy. In the hypertensive cases there appeared to be a rough correlation between the degree of renal inadequacy, as estimated by functional tests, and the height of the blood pressure.

Fahr,[28] who has always insisted on the frequency of a raised blood pressure in this disease, found that in a series of seven cases six presented clinical or post-mortem evidence of hypertension, the most remarkable being a child who died at the age of 5 years from polycystic disease and who showed definite concentric hypertrophy of the left ventricle. Of 74 fatal cases of polycystic disease of the kidney, collected from the records of the Mayo Clinic,[29] 75 per cent. had shown a systolic pressure during life exceeding 145 mm. Hg, while in a control group of 74 patients of similar age and sex suffering from bilateral pyelonephritis only 25 per cent. showed a pressure above this level.

In face of such figures it is impossible to deny that there is a close association between polycystic disease of the kidneys and a raised arterial pressure, an association far too frequently present to be accidental. Of all types of renal disease in which hypertension occurs, it is possibly the condition in which there is most reason to suppose that the rise in blood pressure is secondary and compensatory, since there can be no question that the renal lesion is primary and not the result of any vascular change. In certain other types of renal lesion, however, in which a high degree of glomerular destruction with corresponding renal inadequacy and nitrogenous retention is present, it must be admitted that hypertension is not found. Of such conditions, amyloid disease of the kidney is an example; in the amyloid kidney individual capillary loops of the glomerular tufts may remain patent even in an advanced stage of the disease, but the glomeruli as a whole are severely damaged and a high grade nitrogenous retention is observed. In spite of this the blood pressure is very seldom raised,[30 31] and if a compensatory hypertension is actually evoked by renal inadequacy we must assume that in amyloid disease it is absent owing to the general cachexia; the necessary stimulus is present but the cardiovascular system of the patient is unable to respond.

Experimental Renal Damage

Direct attacks upon the problem of renal hypertension have naturally been made by way of animal experiments. It is impossible to deal with this work in any detail, but it may be pointed out that the difficulties met with are very considerable. In the first place, a chronic experimental nephritis such as is seen in man has not yet been reproduced in animals; secondly, the frequent determination of an animal's blood pressure over considerable periods of time is not an easy problem; lastly, if too much renal tissue is destroyed or removed the animals rapidly become cachectic and die.

The first experimenters to claim to have produced renal hypertension in animals were Pässler and Heinecke,[32] who, after removing three-quarters of the total renal tissue, took away further small portions of the residual kidney substance as hypertrophy developed. The majority of their animals, which survived without developing cachexia, showed hypertrophy of the left ventricle and a small rise in the systolic pressure.

Besides ablation of renal tissue other methods have been used to damage the kidney, such as ligature and embolism of the renal arteries or exposure to radiation.[33] The results obtained have been conflicting. In rabbits surviving for considerable periods with nitrogenous retention as the result of partial ablation of the kidneys, no rise occurred in arterial blood pressure as measured by compression of the main artery of the ear[34]; on the other hand, both in dogs and in rats hypertrophy of the left ventricle and hypertension have been found to follow ablation of one kidney and partial ligature of the arterial supply of the other.[35 36]

Hypertension, when produced, does not appear to have been necessarily dependent on the presence of necrotic renal tissue in the body, since it is claimed to have occurred in ablation experiments, and also to have been present in experiments in which the renal arteries had been ligatured at a time when the necrotic tissue had been completely absorbed. Probably the balance of evidence derived from such experiments, though difficult to evaluate, is in favour of the production of hypertension as the result of renal damage, and more weight may be assigned to the positive than to the purely negative experiments. The results are not, however, so clear-cut as to justify of themselves an unhesitating acceptance of a nephritic cause for hypertension and have not in any way explained the mechanism by which such hypertension is produced, though they suggest that it is usually associated with gross inadequacy of function and retention of the nitrogenous waste products.

Primary or Secondary

We may, I think, conclude that certain hypertensive states are of renal origin, or rather that no other explanation than the coexistent renal lesion can at present be suggested for the presence of a high blood pressure in certain forms of renal disease. Such hypertension may be regarded as compensatory, and probably serves a useful purpose in to some extent making good the loss of glomerular filtering surface. Seen in association with advanced inadequacy of the renal function and definite azotæmia, it certainly appears to be capable of maintaining equilibrium, since in some conditions of renal damage the accumulation of waste products may be checked and remain stationary over prolonged periods: in such patients the supervention of cardiac failure rapidly leads to increasing accumulation of waste products and to uræmia. The raised blood pressure of the third stage of chronic glomerulo-nephritis and of the polycystic kidney may be explained on these lines, and it is probable that renal hypertension of the compensatory type has been produced as the result of experimental damage to the kidneys in animals. In essential hypertension, in its earlier stages, there can be no question of such a compensatory rise of blood pressure, since a renal defect is non-existent; in the last stages of the disease, in those patients in whom ischæmic nephritis with functional insufficiency develops, a renal factor may, arguing from analogy, play some part in the maintenance of the high blood pressure. Even, however, if we may ascribe some types of hypertension to renal inadequacy, the mechanism of their production remains entirely undetermined. It is natural, since we are accustomed to think of hypertension in terms of a humoral theory, to ascribe the rise of blood pressure to the retention of some pressor body, which should normally be excreted by the kidney; but as yet, though nitrogenous retention and a raised blood pressure are associated in these diseases, no such pressor substance has been satisfactorily identified.

In acute *glomerulo-nephritis* and in eclamptic *toxæmia* we have *two conditions* which resemble each other closely both in their symptoms and in the renal findings. Pathologically both are characterised by a glomerular ischæmia, the glomerular tufts in acute nephritis showing a leucocytic infiltration which is absent in the toxæmia. Though ætiologically distinct, there seems to be every reason to believe that the relationship of the raised blood pressure to the renal lesion is the same in the two diseases: clinically data are accumulating which suggest that the rise of blood pressure is primary and precedes the glomerular lesion. From the functional standpoint, if we may take the extent to which waste products accumulate in the blood as an index of the degree of renal insufficiency present, and as related to the stimulus which evokes a compensatory rise of blood pressure, both in acute glomerulo-nephritis, and still more so in an eclamptic toxæmia, such a stimulus is slight or even absent. It would seem probable that in these two diseases the vascular disturbance precedes the renal lesion; just as in essential hypertension vascular spasm precedes and ultimately produces changes in the glomeruli, so in acute glomerulo-nephritis and in eclamptic toxæmia the vascular spasm and rise of blood pressure are primary and the renal lesion secondary. The vascular spasm remains unexplained, but its cause is to be sought elsewhere than in the kidney.

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DISTURBANCES OF THE BODY TEMPERATURE[*]

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Suprarenal Hæmorrhage

There is a rare disease met with in infants, usually during the first year of life, in which the temperature suddenly rises, a purplish mottling appears over various parts of the body accompanied by petechial hæmorrhages and which is likely to prove fatal within 24 hours. Vomiting is usually present at the onset and the condition is likely to be mistaken for the hæmorrhagic form of one of the infectious fevers. Convulsions make their appearance and are followed by hyperpyrexia. In a few hours profound collapse supervenes with cold clammy skin and a rapid feeble pulse which is unaffected by the usual remedies. That the condition in the case of children does not appear to be due to infection and yet is attended by pyrexia and even hyperpyrexia is of special interest in a study of disturbance of the body temperature. On post-mortem examination the suprarenals show a deep purple colour and are distended with blood. Under the microscope the gland is seen to be everywhere infiltrated with blood and particularly is this true of the medulla. In some cases the glandular cells are destroyed and replaced by extravasated blood corpuscles. I have met with the condition in the post-mortem room not only in infants but once or twice in adults with pneumonia. The infantile cases appear to support Cramer's contention that pyrexia is dependent upon changes in the thyroid-adrenal sympathetic system.

Pathological Changes in Fever

In considering the clinical accompaniments of fever, we said that it was usually impossible to discriminate to what extent the febrile state and to what extent the underlying infection was responsible for the various clinical manifestations. When we study the pathological results of fever the same difficulty emerges. Cloudy swelling is widely distributed and is well marked in the liver and kidneys. In more severe or long-standing infections fatty degeneration follows and in some instances focal necroses are met with. Fatty degeneration of the intima of the aorta is extremely common, but the various forms of thrombosis and the rarer mycotic aneurysms which sometimes arise are to be attributed to the underlying specific infection. A variable degree of hyperplasia of lymphoid tissue is encountered in many infections, as is also a greater or less degree of anæmia. The myocardium is subject to parenchymatous and interstitial changes giving rise in turn to low blood pressure and cardiac arrhythmia. The voluntary muscles also are affected by cloudy swelling and fatty changes and in some instances Zenker's necrosis may occur. The latter is met with more especially in typhoid fever and appears only to occur in cases where a high temperature has been allowed to persist for many days. The proliferative changes in the epithelium of the thyroid and the secretory changes in the adrenals have been referred to already. The nervous system may show degenerative changes, but this is seen more especially in those fevers such as diphtheria where the toxin of the disease-producing organism exerts a specific action upon nervous tissue. If acute parenchymatous inflammations develop, particularly in the heart and kidney, they may become chronic and result in permanent disability and ultimately in death. In fact, acute infectious diseases are responsible for many of the chronic diseases to which man is subject. Such sequelæ, it may be pointed out, are more frequent with the severer grades of infection, and young individuals recover more readily than older ones.

Stages of Fever

A febrile illness may be said to present typically three stages, known respectively as the stage of invasion, rigor, or chill, the stage of domination or fastigium, and the stage of decline or defervescence. They may all be run through in the course of a few hours as in an attack of malaria, or they may extend over a period of weeks.

In the *stage of invasion* the superficial vessels of the skin are contracted so that radiation and conduction of heat from the body are reduced to a minimum. The smooth muscle in the skin, known as the arrector pili, contracts and a microscopic quantity of sebum is expressed, closing the pores of the skin and still further limiting heat loss. The hairs of the skin are erected and what is popularly known as goose-flesh or goose-skin results. The patient complains of feeling cold, for his sensations of temperature arise in the skin and not in the viscera, and the use of a surface thermometer proves that the temperature of the surface of the body is below normal. He cowers over a fire or covers himself with rugs or blankets. His teeth chatter and he shivers with cold, thus converting stored-up energy into heat. Every available mechanism is brought into play to stop the dissipation of heat and the internal temperature begins to rise. In spite of the sensation of cold, the temperature of the interior of the body is highest during the stage of chill. In this stage then the loss of heat is diminished, the production of heat is increased, the balance is disturbed in the direction of excess, and pyrexia results.

During the second stage or *fastigium*, the temperature remains high, the skin vessels dilate, and the surface becomes hot and flushed. The shiverings are replaced by a subjective sense of heat, and in some cases the skin becomes moist and further heat is lost by the evaporation of sweat. The pulse is now full and bounding from the increased action of the heart and relaxation of the arterial wall. In this stage the increased production of heat caused by the rigor is maintained by increased metabolism of the body tissues. As we saw in our first lecture, the mere existence of an increased temperature speeds up the metabolic processes and, as a result of this, heat production is still further increased in accordance with Van't Hoff's law that increased temperature accelerates the velocity of chemical reactions. The diminished loss of heat due to the spasm of the cutaneous arterioles present in the first stage ceases with the relaxation of the vessels, but the balance is still against heat loss. The length of the fastigium is often proportional to the time taken to reach the acme. Thus in pneumonia, where the period of invasion is short, the fastigium lasts about a week. In typhoid, where four or five days are taken for the fever to reach its height, the fastigium lasts from 10 to 14 days.

The *stage of defervescence* is indicated by a falling temperature, a less frequent pulse, a moister and cleaner tongue, and a general return towards normal conditions. It may be initiated or accompanied by sweating or other evacuation. When this stage is of short duration the fever is said to fall by crisis, when of long duration, by lysis. Generally speaking, the more rapid the onset of fever the more sudden is the fall. Where the onset has been gradual the more protracted is the defervescence. As the fever declines the arteries are still further relaxed, but the heart's action is less powerful and the pulse becomes softer. Most of the acute infectious fevers are self-limited in their course and defervescence is followed by convalescence. The symptoms have now almost disappeared and the patient gradually resumes his customary strength. During the first few days of convalescence the temperature is often found to be subnormal. Too great a virulence of the invading organism or too low a resistance on the part of the patient may prolong the course of a fever, delay recovery, or result in death. A fatal termination may be ushered in by hyperpyrexia, but more commonly the temperature falls below the normal line and collapse ends the scene.

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Febricula

Febricula is only mentioned to be dismissed. It was commonly defined as a simple fever of not more than a few days' duration, not preceded by any one known antecedent, and not attended by any one distinctive organic lesion. There is little doubt that febricula of the old authors was really an example in a mild form of one of the common infective diseases which has aborted early in the illness before the particular disease has had a chance of running its course.

The Therapeutic Reduction of Pyrexia

The treatment of a febrile disorder will, of course, differ according to the cause, but it is sometimes necessary to take measures to control the attendant pyrexia. In any lengthy fever this is most efficiently carried out by the application in some form or another of cold. Currie of Liverpool in 1787 first recommended the cold bath treatment, but it was soon forgotten. Its reintroduction is due to Brand of Stettin in 1861. My old chief, William Cayley, was the first physician in England to introduce the cold bath in the treatment of typhoid fever and through his able advocacy its use in a more or less modified form soon became general. Prior to its introduction the so-called typhoid state was the usual accompaniment of a continued fever, in spite of treatment by various antipyretic remedies and by enormous doses of alcohol. It was found that the cold bath was followed by slowing of the pulse and by an increase in its tension, by slowing of the respiration, and improvement in the appetite. Under its use the tongue became moist, delirium disappeared, and sleep was restored to the sufferer. Statistics soon showed that by its adoption the mortality of the disease was lessened.

EFFECTS OF COLD ON THE BODY

Exposure to temperatures below −6° C. (about 21° F.) produces destruction of the tissues due directly to the cold. This is probably to be ascribed to some physical change which destroys absolutely the protoplasm of the cells. But here we are concerned only with the general consequences of cold on the body. Its first effect is to contract the musculature of the arterioles of the skin and blood is driven back into the interior of the body. The temperature sinks, metabolism is slowed in all organs, and their activity is consequently reduced. The limbs become weak and stiff and an irresistible desire to sleep is experienced. Just as pyrexia is attended by wakefulness, cold shows its counterpart in somnolence. Possibly the sleep centre which is in close juxtaposition to the heat centre in the hypothalamus is concerned in bringing about this result. Respirations are slow and shallow and the pulse becomes small and weak. If the body temperature continues to fall till 18° to 20° C. (64°–68° F.) is reached the heart stops beating and death supervenes. A perfused heart, beating well upon Ringer's fluid, slows down and stops if the fluid is cooled to 18° C. Such a heart will start beating again if the fluid be warmed, but the resuscitation of the human body is a different matter. Nothing distinctive is found on post-mortem examination and death appears to be due to the gradual slowing down of metabolic processes.

ALGIDITY

This is a valuable term which has lapsed from general currency. It was used by a former generation of physicians, particularly by Byrom Bramwell, to indicate states of general depression of the body temperature. It occurs both as an acute and as a chronic state. General algidity must be distinguished from the condition in which the temperature of the peripheral parts is lowered while that of the central or deeper parts remains normal or is elevated—a condition which may be termed peripheral depression of temperature or peripheral algidity. To quote Byrom Bramwell:—

> "Peripheral algidity with a normal temperature of the central and deeper parts is of common occurrence both in health and disease. It may result from exposure to cold. Healthy persons exhibit great differences in their susceptibility to external variations of temperature. Those whose vasomotor tone is low bear both heat and cold badly; in them peripheral depressions of temperature are readily produced by exposure to external cold, the blood in the peripheral or surface circulation being driven into the central or deeper parts, a result which is not always unattended with danger; for should the arteries—say of the brain—be degenerated, the sudden increase of pressure may lead to rupture and an attack of hæmorrhagic apoplexy. The sudden filling of the deeper vessels which so frequently results in persons of low vasomotor tone from exposure to cold, is probably a common cause of headaches. The increased effort demanded of the left ventricle in order to cope with the increased peripheral resistance due to the action of cold on the peripheral parts is in some cases the immediate exciting cause of an attack of angina pectoris." ("Clinical Studies.")

Peripheral depression with a normal temperature of the central and deeper parts is common in disease; while peripheral depression with central elevation is of frequent occurrence in febrile disorders. During the stage of rigor, for example, the rectal temperature may be rising rapidly and very much above the normal, while the patient is shivering with cold and the temperature of the peripheral parts subnormal. In cholera, too, the surface temperature may be greatly depressed while the central (rectal) temperature is normal or much above normal. In some cases of sclerema neonatorum remarkable differences have also been noted between the peripheral and central temperatures. Many other examples of a similar kind might also be mentioned.

Acute general algidity, that is to say an abrupt depression of the body temperature, is seen in prolonged exposure to severe cold. Recovery has been reported in persons who have missed their way on mountain paths and have been found with temperatures in the neighbourhood of 78·5° F. A drunken man is especially liable to experience a marked fall of temperature if exposed to cold or inclement atmospheric conditions on account of the dilatation of the skin vessels produced by alcohol. Conditions producing profound shock and depression, especially where associated with severe traumatic injuries such as perforating wounds of the thorax and abdomen, severe lacerations, burns, or hæmorrhage, form another group of cases, and during the war every big push provided us with countless instances. In civil life all internal and spontaneous, as distinguished from external and traumatic, causes of collapse and shock may be attended with algidity, such as the passage of biliary or renal calculi, strangulation or obstruction of the intestines, or rupture of an abdominal viscus.

A sudden and profuse loss of blood is attended by a fall of temperature, well exemplified when the bleeding occurs as in typhoid during the course of a fever in which the temperature is above the normal. A similar fall in this disease attends intestinal perforation. In such circumstances the algidity is as a rule of brief duration and, where the patient survives, the thermometer, after a few hours, often exceeds its previous reading. Sudden and profuse diarrhœa or copious vomiting such as is seen in the summer diarrhœa of children may be followed by a great depression in temperature. The same phenomenon also occurs in Asiatic cholera in which, however, the internal temperature is often much elevated when the surface reading is markedly depressed. To the sudden fall of temperature at the onset of cerebral hæmorrhage we have already referred in a previous lecture. Charcot emphasised the depression of temperature which often ushered in the onset of pericarditis in elderly people, and Byrom Bramwell has made the same observation at the commencement of an attack of peritonitis. Other examples may be quoted such as asphyxia, acute yellow atrophy of the liver, and during the course of uræmia. Lastly may be mentioned the pre-agonistic fall of Wunderlich in which at the fatal termination of a febrile disease along with a falling temperature there is a rise in the frequency of the pulse and sometimes of the respirations, the pulse becoming thready, often irregular, and at last imperceptible. Quite exceptionally the pulse frequency lessens in the collapse which precedes death.

In cases of algidity speaking generally it may be said the greater the fall the more serious its significance, but the character of the associated symptoms and physical signs and the conditions in which the fall occurs must always be taken into account in forming a prognosis. Provided that the patient survives the period of depression the rise which succeeds may be of considerable duration. Instances may be cited in cases of apoplexy and in pulmonary tuberculosis where, after the fall of temperature attendant upon a profuse hæmoptysis, the subsequent rise may be of lengthy duration, being in many cases due to an inspiration pneumonia set up by the extravasated blood.

Chronic general depression of temperature is seen in myxœdema, chronic uræmia, catarrhal jaundice, and in some melancholic forms of insanity. In cancer of the stomach the temperature is not infrequently 1°–2° below normal, the depression being due to inanition rather than to the pathological character of the lesion. In many cases of chronic cardiac disease associated with cyanosis a subnormal temperature is seen. This is notably the case in morbus cœruleus. I would especially draw attention to certain cases of infective endocarditis. It is remarkable that in this disease clinical manifestations of mechanical disturbance of the circulation are so curiously lacking, the presenting features of the disease being predominantly those of the septicæmic component. I learnt a personal lesson many years ago.

There was admitted into the Middlesex Hospital a man presenting extensive œdema of the legs. He had been ill for many weeks. A systolic murmur was audible over the mitral area and the liver and spleen were enlarged. He gradually grew worse and died at the end of a ten days' sojourn. During this time the temperature had been subnormal. I had regarded him as a case of mitral regurgitation with congestive failure. Post-mortem examination revealed the existence on the mitral valve of those exuberant, friable vegetations characteristic of infective endocarditis. For the first time I realised that where congestive failure supervenes before death in infective endocarditis apyrexia may prevail. I had omitted to appraise the significance of the constant presence of blood in the urine and the degree of enlargement of the spleen.

Pyrexial Treatment of Disease

Little more than passing reference can be made to this subject. Treatment of general paralysis of the insane by Julius Wagner von Jauregg in 1917 has led to a great change in the treatment and prognosis of this disease. Since 1922 this treatment has been carried out systematically in many mental hospitals in England. Many other methods of inducing pyrexia have been employed, among which may be mentioned the subcutaneous injection of sodium nucleinate, hetol, and boiled milk, the intravenous injection of vaccines of *Bacillus typhosus* and of streptococci and staphylococci, the intramuscular injection of sulphur suspended in olive oil, and the inoculation with the organisms of rat-bite fever and of relapsing fever.

The best results have been obtained with *malaria*. The cause of the beneficial action of malaria is still uncertain. The generally accepted view is that the resulting pyrexia is the principal therapeutic factor. Another suggestion is that the antibodies formed by the patient against the malarial parasite are also effective against the spirochætes and that increased permeability of the capillary walls allows antibodies already present in the blood stream to penetrate to the spaces around the nerve-cells and reach spirochætes previously inaccessible. Histological examination of cases that have died after treatment fails to show the presence of spirochætes in the brain.

Therapeutically, malaria may be inoculated by the bite of an infected mosquito and in England such mosquitoes can be obtained from the Ministry of Health. In mental hospitals there are usually enough patients under treatment to permit of transmission to be kept up from case to case. The donor's blood is withdrawn, preferably during the decline of the pyrexia, and from 1 to 5 c.cm. are injected into the patient, usually by the subcutaneous route. If injected intravenously the incubation period is shortened. The incubation period is extremely variable, ranging from a few days to several weeks. The patient is usually allowed to have a series of ten malarial paroxysms and the infection can be terminated at any time by the exhibition of quinine.

Malarial therapy is unsuitable for debilitated patients and those showing evidence of cardiovascular disease. Should cardiac failure supervene the infection must be terminated. The best results are obtained in early cases. Juvenile paretics do not respond. The principal change in favourable cases is in the mental condition. No change occurs in the reaction of the pupils or in other reflexes. There is usually a reduction in the number of cells and in the globulin content of the cerebro-spinal fluid. The Wassermann reaction becomes less strongly positive and in exceptional cases becomes negative. It is said that 20 to 30 per cent. recover sufficiently to take up some form of work.

The use of Coley's fluid in the treatment of sarcoma may be instanced as another example of the pyrexial treatment of disease. The mixed toxins of the

Streptococcus erysipelatis and *Bacillus prodigiosus*, beginning with small doses and increasing until a rise of temperature is produced, are injected, if possible into the tumour. The injections are repeated daily or on alternate days for at least a month. If after this time there are signs of improvement the treatment is continued for a year. In this country the treatment seems very largely to have fallen into disuse.

Before concluding this section reference may be made to the improvement which is occasionally seen when for any cause fever arises during the course of a chronic illness.

Quite recently I have had under my care in hospital a girl suffering from subacute nephritis. She showed extensive œdema of the legs and ascites. The urine was loaded with albumin, a little blood was present on two or three occasions, and the blood cholesterin was high. For several months she had gradually been losing ground and the abdomen had been tapped on three occasions. An attack of acute tonsillitis attended by fairly high pyrexia lasting for the greater part of a week supervened. As the fever declined an enormous diuresis set in, and within another week the œdema of the legs had disappeared. The urine now contained little more than a trace of albumin. A surgeon who had seen her and had suggested a modified Le Riche's operation on the renal artery felt that he had been outwitted and she left the hospital, well, a fortnight later.

In this connexion I should also like to refer to a case of Graves's disease seen during the early part of the war.

The patient, a woman of about 30 years of age, living in Croydon, was attending the out-patient department of the Middlesex Hospital. As she was suffering from severe pyorrhœa, three or four teeth were extracted on the assumption that the infection might be responsible for the hyperthyroidism, but no improvement occurred. Seeing that she was pregnant and travelling facilities at that time were not easy, she said that she should cease coming up to the hospital till after her baby was born.

I saw nothing of her for six months, when she again paid a visit to the hospital. She had gained in weight and, except that the eyes were slightly prominent, the symptoms and signs of Graves's disease had disappeared. When I asked her what had been happening, she said that she was better and had come up because she had pain and swelling over the breast bone—she had in fact an infective arthritis of the right sternoclavicular joint. She stated that a week after the birth of her baby, which had occurred four months previously, she developed severe tonsillitis with high fever, that she was very ill for a fortnight and that her doctor had been greatly concerned about her. The temperature then fell and to her surprise the swelling in her neck went down and all her tremulousness and palpitation subsided.

The only suggestion that I can offer in explanation of this remarkable improvement is that the patient had been harbouring an infection in her tonsils from which absorption had long been taking place and that this in turn had given rise to Graves's disease. As the result of acute tonsillitis protective substances had been formed in such abundance as not only to overcome the acute tonsillar infection but also to completely eradicate the infective focus in the tonsils which was responsible for the long-standing hyperactivity of the thyroid gland.

Diagnosis

Sometimes a study of the temperature chart will give an important clue to the diagnosis of a case. For instance, a double diurnal rise is sometimes seen throughout a case of kala-azar. Relapsing fever presents a five or six days' period of high fever followed after a sudden fall by a five or six days' period during which the temperature remains fairly close to the normal line, and this in turn is followed by an abrupt rise to 104° or 105° for a further five or six days' period and so on. The temperature charts of tertian and quartan malaria may also be instanced. Unfortunately, while a fever is in progress we cannot examine the chart of the period still in front of us, or typhoid might be added to the list of diseases yielding a distinctive picture, with its staircase rise, its ten days' period of continued fever followed by a remittent and then an intermittent stage.

In cases of pulmonary tuberculosis a study of the temperature chart will help to determine the type of disease with which we are dealing. Thus acute caseating tuberculosis will show much wider excursions between the morning and evening temperature, and the general level is likely to be higher, than in cases of fibrocaseous tuberculosis, and the chart may be said to have prognostic as well as diagnostic implications. Although occurring in other diseases an inverse type of temperature may be expected in cases of miliary tuberculosis.

In attempting to ascertain the cause of fever, one naturally seeks to correlate the febrile condition with such other symptoms as are present and with such physical signs as are elicited by a careful examination of the patient. Sometimes one finds that crepitations over a small area in the lung have been overlooked or such have been late in making their appearance. In other cases it may be râles are discovered but one feels that their presence is insufficient to account for the general condition of the patient in question, their presence being simply an incidental complication of some more serious underlying condition. It is not always remembered that simple bronchitis is unlikely to give rise to pyrexia higher than 100·5° or 101°, and that in cases where the temperature exceeds this point it is likely either that there is a complicating broncho-pneumonia or that the bronchitis is secondary to some specific underlying infection such as typhoid fever.

Where the fever has been of short duration the possibility of the case being one of the acute specific fevers in which the rash has not yet appeared must be taken into consideration. In this respect perhaps the greatest difficulty may arise in the case of German measles, where in exceptional cases fever may exist for seven days before the eruption makes its appearance. During this time there is sometimes a complaint of stiff neck, and examination may show the existence of enlarged occipital, cervical, or axillary glands. In a case presenting these features it may be difficult to dismiss the possibility of glandular fever, and the more so as the mononucleosis characteristic of this disease may not be established till the third week of the illness in the case of an adult.

Another febrile disease in which difficulty in diagnosis may arise is erythema nodosum. It occasionally happens that fever persists for ten or twelve days without any adequate explanation for its presence until the typical nodules make their appearance. In herpes zoster, again, the eruption may be preceded by fever and malaise of a few days' duration and it may be impossible to make a conjectural diagnosis at this time unless initial pain is also present.

Pyrexia may undoubtedly occur in the absence of specific infection in cases where the heat-regulating mechanism has been rendered unstable by drug addiction such as morphia or alcohol or by a recent long-continued febrile illness. Pyrexia sometimes persists for several weeks after the original infection has come to an end. This may be exemplified by a reference to measles where a continuance of fever can sometimes be ascribed to inflammatory changes occurring in bronchial glands which have become infected as a result of the absorption of toxic substances from the inflamed bronchi. Radiological examination in these cases reveals the presence of enlarged glands. While glands are in this condition the child should be kept under medical supervision and special care should be taken to prevent exposure to any possible source of tuberculous infection. Another condition which sometimes gives rise to difficulty in diagnosis is subacute rheumatism in children. The onset is frequently insidious and symptoms at first may be equivocal.

I saw a case recently in which slight fever of three weeks' duration was associated with tenderness over the mastoid process and the question arose whether mastoiditis was the cause of the continued pyrexia. The hands were clammy, the pulse frequent, and on auscultation the first sound of the heart was short and of poor quality, while the cardiac rhythm was tic-tac in character. Ten grains of sodium salicylate were given every four hours but as three days later the tenderness over the mastoid was still present and the pyrexia, though running at a lower level, still continued, it was thought risky to delay operation. Nothing was found on exposure of the mastoid cells and, on increasing the dose of salicylates, the fever came to an end. It is clear that larger initial doses of the drug would have saved the child from unnecessary surgical intervention.

Occasionally children become febrile after the ingestion of certain foods: the so-called carbohydrate fever may be mentioned as a well-known example. A child harbouring round worms sometimes suffers from a low fever which may be baffling unless the possibility be borne in mind. I remember taking a midnight journey to Worcestershire to see a child who had been running a high temperature for a few days and who had been a complete puzzle to her doctor. Half an hour before my arrival pus had poured from the auditory meatus and unexpectedly established the diagnosis which had been sought in vain! Occasionally it appears to be quite impossible to determine the cause of severe pyrexia in children and it is to this type of case that Dr. Frederick Taylor gave the name of innominate fever. Metabolic disorders are sometimes responsible for pyrexia; thus fever may occur with Graves's disease and with gout in the absence of any obvious infection. Persistent pyrexia showing considerable oscillations sometimes occurs in association with cirrhosis of the liver, a fact which is sometimes adduced in favour of cirrhosis being properly regarded as a form of hepatitis.

The need for a complete examination in all cases of cryptogenic fever is well exemplified by the case of a little girl who ran a high temperature without any cause having been discovered. One day the nurse was asked to give an enema and reported that a curious condition of the vulva was present. On examination this was found to be due to cancrum vulvæ although there had been no complaint of pain. Energetic treatment was carried out, and I am glad to say the patient recovered.

Persistence of fever after abdominal operations sometimes gives rise to much anxiety. I do not refer to cases in which a wrong diagnosis has been acted upon and appendicectomy performed, for example in cases of colon bacilluria or in typhoid fever. A case of the sort I have in mind recently came under my notice.

An acutely inflamed appendix had been removed, but to the surgeon's disappointment the fever persisted and the presence of increasing abdominal distension associated with diarrhœa suggested the possibility of the case being one of typhoid fever. I suggested that a leucocyte count would be helpful, and it was found that there was a leucocytosis of 28,000 with a relative increase of polymorphonuclear cells. It was agreed that the surgeon should reopen the abdomen. When this was done a chain of acutely inflamed retroperitoneal lymphatic glands was discovered running along the iliac vessels.

I made reference to cases of abdominal distension associated with retroperitoneal lesions in the Lumleian lectures in 1932. Distension in these cases appears to be due to stimulation of the abdominal sympathetic system.

In another case which I saw last year a hæmatoma formed on the fourth day at the site of incision after an operation for a right inguinal hernia and slight fever was present. The hæmatoma was evacuated but the pyrexia became more marked. On the tenth day after the operation the patient had an attack of dyspnœa accompanied by acute pain in the chest and hæmoptysis. Examination of the chest revealed the existence of a pulmonary infarct. The femoral regions were examined for evidence of venous thrombosis but none was forthcoming. On examination of the back I found there was tenderness and œdema with pitting of the lumbar regions, more marked on the right side but present to a less degree on the left. The case was one in which thrombosis had tracked up from the site of the hæmatoma to the lumbar veins. After a stormy convalescence during which pulmonary infarction occurred on three occasions in all the patient recovered.

Abdominal distension with fever is sometimes seen in cases of malignant ovarian tumours with scattered metastases in the peritoneum. In such an instance, which I saw recently, it was difficult to decide whether the case was of this nature or whether it was one of tuberculous peritonitis of the ascitic variety. Where vaginal examination fails to elucidate the condition, laparotomy may be the only certain means of making the diagnosis. Sometimes a carcinoma of the colon is attended by pyrexia. In one case under my care in hospital in which symptoms of partial obstruction were associated with pyrexia and leucocytosis an annular carcinoma had ulcerated through the posterior wall of the colon and had led to the formation of a small abscess in the retrocolic tissues. The difficulty of distinguishing between such a case and diverticulitis unless X ray evidence is forthcoming is obvious. Of all malignant growths perhaps hypernephromata are most constantly associated with pyrexia.

Hodgkin's disease, gumma, and undulant fever are other conditions which must be borne in mind in cases of cryptogenic fever. I have of set design devoted so much time to stressing the importance of correlating pyrexia with clinical findings that I can do scant justice to the immense help which laboratory investigations afford in circumstances like these where the cause is in doubt. I feel that perspective is likely to be lost unless laboratory investigation is entered upon with circumspection and due regard to the end we have in view. To quote Drs. G. Bourne and K. Stone :—

> "The pathological laboratory should be used as a place which will return specific answers to specific questions, rather than as a temple to which the harried physician turns entreating arms in the extremity of his need. The man who when baffled demands a blood culture, a complete blood count, and every other test that he can think of is as likely as not to receive answers to his questions that will only serve to lead him deeper into the mire of doubt." (The Principles of Clinical Pathology in Practice, London, 1929.)

Not only so, but we must bring our judgment to bear on such results as these investigations may bring to light. Among the most useful adjuncts to the diagnosis of cryptogenic fever one would mention blood culture. Clinical pathologists have a way of delaying their reports, and in a case of food poisoning which I saw some time ago with Dr. Seymour Maynard and Dr. C. R. Box the patient was not only dead but embalmed before a report was received saying that *B. aertrycke* had been obtained from the blood ! But all facetiousness apart, in a case in which there may have been a lurking suspicion of tubercle it may be very reassuring to learn that *Brucella abortus* or *melitensis* has been cultured from a case which has shown little constitutional disturbance beyond fever and profuse sweating. A blood count may afford great assistance, and cognisance should be taken of the red cells as well as the white. Thus in a case of glandular fever the white cell count may suggest acute leukæmia but the absence of change in the red cells in the former will be of great significance. A leucocytosis with a relative increase in the polymorphonuclear cells will serve to distinguish pyogenic infections in general from the enteric group of fevers and other conditions in which leucopenia prevails. In the febrile blood diseases a blood count becomes essential for diagnosis. Similarly in agranulocytosis and monocytic angina the correct designation will very largely depend on the blood picture. In aplastic anæmia the red count will be low, whereas in agranulocytosis the red count is likely to be normal or nearly so. Examination of cerebro-spinal fluid, sputum, urine, and fæces may all provide their quota in a puzzling case. Biochemical and radiological examination may lead to further elucidation.

Climate

A few considerations on the adaptability of the body to climate may not be inappropriate to our subject. We have seen that if the body temperature is to be raised this can be accomplished in two ways, either by preventing heat loss or by speeding up the rate of heat production. Similarly, the body temperature can be lowered by increasing heat loss at the surface of the body or by slowing down the production of heat within. In health we can control heat production to a certain extent. When it is very hot appetite fails and the diminished intake of food will provide less fuel to be oxidised, and we have seen already in accordance with Van't Hoff's law that the chemical processes of the body are less active if its temperature is allowed to fall below a certain optimum. Moreover, when it is hot we do not feel like taking violent exercise, and since exercise generates heat, in this way also, we can limit heat production. On the other hand, when it is cold we eat more and take more exercise, and the more active we can make the heat-generating processes the more active does secondary heat production become.

Most animals with a constant body temperature are provided with a thick coat of hair or feathers which they can use to adjust the amount of heat leaving the surface. The robin, while sitting quiet on a cold winter's day, has his feathers all puffed out, and by this means is able to entangle a great deal of air, which is a comparatively poor conductor of heat, between his feathers. This layer of air, warmed by the heat of his body and intervening between his body and the colder air around, affords an efficient protection against the loss of heat. On a warm day the feathers are held tightly against the skin so that heat may escape more easily. We can produce a like result by clothes; on a hot day we wear as little as possible so that air can reach the skin and carry away heat by convection, while on a cold day we wear more clothes so as to imprison several layers of air between our body and the outer world, and we button up our coat so as to prevent these layers of air from losing heat by convection. From what has been said about the entanglement of air it becomes clear that two garments are more efficient than one of double thickness. Fur entangles a great deal of air and so is particularly suited to cold weather. But the most important thing of all in great cold is for clothing to be windproof. Eskimos wear only one garment. It is made of sealskin with the fur inside. It is tied tightly round the wrists and legs and at the neck and is windproof. Arctic explorers nowadays provide themselves with special windproof overalls which are lighter than fur clothes. Similarly oil is sometimes smeared over the body by farers on the North Sea on wintry nights to prevent the dissipation of heat.

Man, by the invention of clothing and by learning how to kindle fire, has made himself master of his climatic environment. Climate influences man in many subtle ways. I am indebted to Ellsworth Huntington's "Civilisation and Climate" for the following interesting facts.

> He states that both physical and mental activity are more pronounced in the spring and autumn than in midsummer and in midwinter. The most important climatic factors in order of decreasing importance are: (1) the mean temperature month by month; (2) the amount of change in the weather from one day to another; (3) the relative humidity. Changes of temperature, provided they are not excessive, are more stimulating than uniformity. In temperate climates a fall is more stimulating than a rise, and people are less efficient on fine days with a clear sky than on cloudy days or after a storm. It is comforting to know that the greatest efficiency in physical and mental activity is found with a mean temperature lying between 50° and 60° F.; it falls rapidly as the mean temperature rises above 65° F. It thus becomes possible to establish what constitutes an ideal climate—ideal from the point of view of human efficiency.
>
> Meteorological data show that climatic conditions approaching this ideal occur in western Europe and that the climate of England comes nearest to the ideal, and much the same may be said for that of Japan, New Zealand, and the south-eastern part of Australia. In the western hemisphere southern Canada, the east and central portions of the United States, and those portions of the Pacific coast stretching from British Columbia to California fall within the same category. While admitting the cogency of other factors, Huntington concludes: "No nation has risen to the highest grade of civilisation except in regions where the climatic stimulus is great."

Cramer claims that the thyroid-adrenal apparatus supplies the connecting link between climate and civilisation. Among other things he finds that a change from a warm to a cool environment is a much more powerful stimulus to the adrenal gland than a continuously cool environment. He maintains that the thyroid and adrenal glands are not merely regulators of metabolism but that their functional state affects man's physical activities and "colours his mentality." He regards the cool, variable climates in which human activity attains its greatest development as the constant source of stimulation of these endocrine organs. Not only then have hormones played their part in the history of the human race but in the more restricted sphere of everyday life Cramer would apply the same explanation to the relations between climate and health. We usually regard a bracing climate as one which leads to increased metabolic changes in the body, and a relaxing climate as one which makes fewer demands on man's metabolic activities. Cramer asks the question why resistance against infections such as tuberculosis is increased by a suitable, cool, dry climate, and by measures such as open-air treatment, hydrotherapy, and the like. He criticises the answer usually given that these conditions increase metabolism by pointing out that increased metabolism in itself does not explain the beneficial effect, for increased metabolism can be induced by other measures such as vigorous muscular exercise, which is likely to be harmful. According to his view those measures are beneficial which stimulate the thyro-adrenal apparatus without exhausting it and thus strengthen one of the normal reactions of defence of the organism against infection. "Conversely a warm moist monotonous climate weakens resistance against infections, not because it reduces metabolism but on account of the continued absence of a stimulus to the thyro-adrenal apparatus and the sympathetic."

Concluding Considerations

We have seen that metabolism is responsible for heat production; that a centre in the hypothalamus is concerned with the regulation of body temperature; that the centre is so constituted as to be sensitive to the temperature of the blood passing through it. If this temperature is raised the various means for increasing heat loss and decreasing its production are brought into play. If the temperature is lowered those for decreasing heat loss and for increased heat production become operative. We have also seen that the thyroid and adrenal glands acting through the sympathetic nervous system influence metabolism and together form a "humoral apparatus" (Cramer) concerned in heat regulation of the body; that the heat centre may be regarded as a group of nerve-cells representing the central connexions of the sympathetic. When we consider that during muscular exercise heat production may be increased from 200 to 300 per cent. without the temperature rising, whereas in fevers heat production may only be increased from 20 to 30 per cent. and yet pyrexia results, it is obvious that in cases of fever some *lack of adjustment* must occur. In infective conditions pyrexia must be regarded as the resultant of two forces: the toxic action of the invading organism on the one hand and the resistance of the infected person on the other. Such a conception is borne out when the temperature chart is studied in conjunction with the curve of the opsonic index. Stated in broad terms it may be said that the elevations on the temperature chart correspond to depressions of the opsonic curve and vice versa, that is, that the temperature chart bears an inverse relationship to the opsonic activity.

Since aseptic suppuration is accompanied by fever some investigators ascribe the fever and chills which occur in cases of suppuration to the absorption of autolytic products rather than to the direct action of poisons produced by the invading organisms. The rise of temperature which occurs when a patient begins getting up too soon after a pyrexial illness is to be ascribed to the increased cardiac action (consequent upon the increased exertion) washing out inflammatory products from the affected area into the general circulation.

The occurrence of pulmonary infections after anæsthesia is perhaps favoured by the thyro-adrenal exhaustion which follows the exhibition of general anæsthetics.

No mention has been made of hysterical fever as so little is definitely known of the processes concerned in its production, but that such occurs quite apart from fraud is generally admitted. In conclusion I cannot do better than to quote the concluding sentences of Cramer's "Fever, Heat Regulation, Climate and the Thyroid-Adrenal Apparatus," a book to which I have frequently referred during the course of these lectures.

"The study of the physiological basis of the effect of climate on man shows us man fashioning his own development by struggling to free himself from his climatic environment. We have seen that man in his natural state is unfitted to exist in any but a tropical climate. But this is the very climate which places a limitation on his mental development. The invention of clothing and, even more, of fire freed him from his thermal environment and enabled him to establish himself in climatic conditions where his mental and physical energy could find their highest development. We may have forgotten what the invention of fire meant to mankind. Primitive man expressed its deep significance in the Promethean myth that fire was a secret stolen from the gods to render man like unto them."

INJECTION OF THE GASSERIAN GANGLION

By H. S. Souttar, C.B.E., M.Ch. Oxon., F.R.C.S. Eng.

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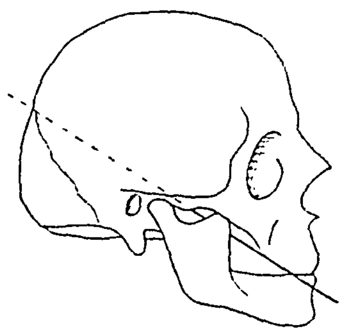
Injection of the Gasserian ganglion for the relief of pain is one of the most valuable of surgical procedures. Quite apart from trigeminal neuralgia itself, the region supplied by the trigeminal nerve is a common site for the development of carcinoma in various forms, which may in its later stages give rise to pain of a very severe type which even morphia may fail to control. If properly carried out, injection of the ganglion may in all these cases give permanent relief, but a very precise technique is essential to success. It has frequently been stated that the uncertainty of the injection and the risks involved render it unsuitable for general use, and some surgeons would advise in preference such a considerable operation as is involved in division of the sensory root. In a long series of cases, however, I have met with such uniform success that I am convinced of the value and safety of the procedure.

The method first described by F. Hartel[1] is in my view far superior to the transverse methods described by F. Ostwalt and Schlösser.[2] Although the skin is entered at a point somewhat more distant from the foramen ovale, this increase in the distance of the objective is fully compensated by the fact that the plane of the foramen is at right angles to the needle, and the foramen itself is therefore as open as possible, whilst the anatomical structures adjacent to the path of the needle greatly facilitate its accurate insertion. Moreover, after entering the skull the needle now lies in the plane of the ganglion and the certainty of the injection being limited to the ganglion is therefore assured.

FIG. 1



A fine needle 10 cm. in length is inserted into the cheek at a distance of 1 in. external to the angle of the mouth, and it is directed upwards and inwards towards the lambda (Fig. 1), the point on the skull where the lambdoid and sagittal sutures meet. Passing at first through the substance of the cheek, the needle enters the internal pterygoid muscle on the inner side of the coronoid process. Leaving this, it enters the external pterygoid and comes to rest at the root of the external pterygoid plate. The point of the needle now rests just in front of the foramen ovale and on the base of the skull (Fig. 2). The needle is now partly withdrawn and directed slightly posteriorly to its former line, when the point should pass through the foramen ovale into the ganglion itself.

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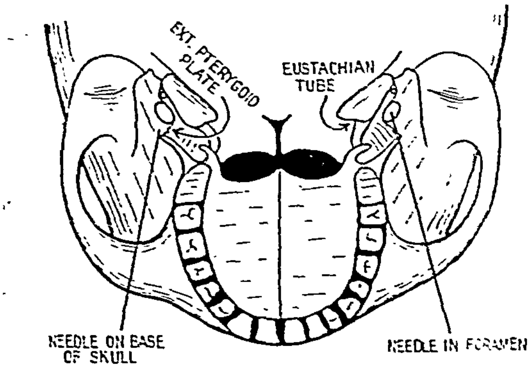
[1] Arch. f. Klin. Chir., 1912, c., 193.

[2] See H. Braun: Die örtliche Betäubung. Leipzig. 1925. p. 279.

In a normal individual the point of entry of the needle should be a little higher, but as most of the cases with which one has to deal are edentulous the point we have given is usually the best. In most cases it will be found that the foramen ovale lies precisely on a line between this point and the lambda, and it is therefore wise, in the first instance, to direct the needle slightly in front of this line in order that the base of the skull may be identified. Unless this precaution is taken one may easily enter the skull without touching the bone, and it is then impossible to establish the depth of the point of the needle with any certainty. The lambda is my own landmark, and is far simpler than those described by Hartel. It is easily felt as a depression on practicaly every skull, and if the index-finger of the left hand is placed on this point it will be found a very easy matter to direct the needle towards it. 1 c.cm. of 60 per cent. alcohol containing 2 per cent. of beta eucaine is now injected very slowly, when an immediate total paralysis of the fifth nerve should result, as is at once proved by the abolition of the corneal reflex. The time of the injection may with advantage be extended over as much as two minutes, the slowness of the injection increasing the certainty of the result. The eyelids are now gently drawn together by a fine silkworm suture, and in a conscious patient the painless insertion of this is in itself evidence of a successful injection. The suture is left in place for five days, the eye being carefully washed out twice a day with weak boric lotion, and if this precaution is taken it will be found that all risk of corneal ulcer is avoided.

FIG. 2



If the injection is carried out as described it is without danger, and the results are in many cases permanent. Certain contingencies must, however, be avoided. If the needle is passed too far it will enter the posterior fossa of the skull, and the injection of alcohol may paralyse the sixth, seventh, and eighth nerves, and may even injure the medulla. Such a catastrophe may, however, be avoided by noting the escape of cerebro-spinal fluid from the needle, and if this happens the alcohol must on no account be injected until the needle has been sufficiently withdrawn. If the ganglion itself is not entered the result will not be permanent, since the alcohol only reaches the nerve trunks, which can regenerate. If the needle is pointed too far backwards it may enter the Eustachian tube and alcohol may be injected into the middle ear, producing great pain.

In almost every case there will be a complete paralysis of the muscles of mastication on that side, but in many cases this is temporary, for with regeneration of the motor roots, the nucleus of which is of course not affected, the muscles may regain their power. In the rare cases where a bilateral injection is ultimately required this point is of great importance, since a bilateral paralysis of the muscles of the jaw would be an impossible condition.

I prefer to carry out the operation without general anæsthesia as the coöperation of the patient is a considerable help. The preliminary injection of a little 1 per cent. novocain along the track of injection saves the patient from any considerable pain, but as in many cases one is dealing with a patient exhausted by suffering I usually give half an hour beforehand gr. 1/6 of morphia and gr. 1/150 of scopolamine. If it is preferred there is no objection to a light general anæsthesia, but it must not be sufficient to abolish the corneal reflex, for otherwise the chief indication of the success of the operation is lost.

The operation demands considerable manipulative dexterity and should only be attempted after practice on the cadaver.

IRON IN THE TREATMENT OF SPLENIC ANÆMIA

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In its commonest form splenic anæmia may be defined as a chronic disease, characterised by splenomegaly and hypochromic anæmia, with leucopenia, no enlargement of lymphatic glands, a tendency to gastro-intestinal hæmorrhages, and, in the late stages, a liability to cirrhosis of the liver. Histological examination of the spleen reveals pathological changes which are characteristic of this form of the disease group, which corresponds most strictly to "Banti's disease."[1]

The treatment almost universally recommended is splenectomy, preceded, when necessary, by blood transfusion. A study of many of the best-known text-books of medicine shows that iron therapy is believed to be of little or no value. In some books its inefficacy is indicated by absence of any mention of the metal, while in others it is positively stated to be valueless. At the joint meeting of the sections of medicine and surgery of the centenary meeting of the British Medical Association in London (1931), it was stated that the failure to respond to treatment with iron was a valuable point in the differential diagnosis between splenic anæmia and the nutritional anæmia of women, in which achlorhydria is frequently present and some degree of splenomegaly is not uncommon.

My experience of the excellent results which may not infrequently be obtained by iron therapy in splenic anæmia led me to protest against this therapeutic test being accepted as of differential diagnostic value. From what has been said above, it is evident that the view appears to be widely held that iron is of little or no value in the treatment of splenic anæmia. In order to demonstrate that this is not necessarily the case, reports of cases treated with iron are appended below, and illustrate the valuable results which may be obtained. These cases were selected from a larger series which have been under my charge during the past two or three years, because any doubt regarding the correctness of clinical diagnosis was subsequently satisfied by histological examination of the spleen.

CASE RECORDS

CASE 1.—Female, aged 22, domestic servant, admitted to Royal Infirmary, Aberdeen, on Sept. 7th, 1933, complaining of breathlessness and pain in the chest on effort. There was no family history of anæmia, jaundice, or hæmatemesis. The patient had had rheumatic fever in 1932, otherwise no illness of importance. Since the age of 12, when menstruation had started, the patient has always been somewhat pale and breathless on effort. Her periods were irregular and sometimes excessive. At the age of 15 she had had a severe uterine hæmorrhage which necessitated hospitalisation for two weeks. In June, 1932, she was confined and suffered from puerperal sepsis. In July, 1932, she had a sore-throat and pyrexia, which was followed by pain and swelling in her knees, ankles, and fingers. A diagnosis of rheumatic fever was made. The patient was in bed four weeks. In July, 1933, she had a severe epistaxis, but there was no history of hæmoptysis, hæmatemesis, or hæmaturia. Her doctor said that anæmia and enlargement of the spleen had been present for about seven years.

Her nutrition was good but pallor was marked. There was no jaundice or enlargement of lymphatic glands. Temperature was normal, pulse-rate 72, and blood pressure 146/82. The apex-beat of the heart was within the nipple line in the fifth interspace, and there were systolic murmurs at all areas. The spleen was greatly enlarged to below the umbilicus, firm and slightly tender to touch. The liver dullness was slightly decreased; the red cell fragility test was normal. Hess's capillary test was negative. Test-meal showed histamine-fast achylia, no retention of charcoal, and no blood or lactic acid. Blood count on Sept. 11th, 1933, showed: 3,120,000 red cells; 40 per cent. of hæmoglobin; a colour-index of 0·65; 1600 white cells; reticulocytes, 1·4 per cent.; platelets, 275,000; icterus index, 7; van den Bergh reaction positive indirect; and Wassermann reaction negative.

A diagnosis of splenic anæmia was made, and treatment with iron was instituted as a pre-operative measure. Ferrous sulphate exsiccatus, grs. 3, in tablet form, was given thrice daily. A steady improvement in the blood count and clinical condition occurred, and in six weeks the blood count was: red blood-cells, 4,910,000; hæmoglobin, 83 per cent.; colour-index, 0·84; white blood-cells, 2200; reticulocytes, 1 per cent.; platelets, 140,000. The spleen was slightly reduced in size but still reached to the umbilicus. On Oct. 30th splenectomy was successfully carried out by Prof. Learmonth. The spleen weighed 1070 g. On Nov. 9th, after a sore-throat, the patient developed rheumatic fever with numerous swollen and painful joints. She returned to my ward for medical treatment. Examination revealed a pericardial rub and great cardiac dilatation. The apex-beat was felt in the anterior axillary line. Pericardial effusion developed. The patient had a high, swinging temperature, and for three weeks was so critically ill that her life was despaired of. Eventually the condition settled down and the patient was removed to a convalescent home. She returned to the infirmary on Feb. 16th, 1934, greatly improved. The apex-beat had now returned to the nipple line Despite the serious operation and the toxic effects of rheumatic fever, iron administration had maintained her blood level at R.B.C., 4,100,000; Hb., 85 per cent. The patient is now extremely well.

CASE 2.—Female, aged 42, admitted to Royal Infirmary on March 1st, 1932, complaining of general weakness and breathlessness on effort. Her father was said to have been anæmic. Four sisters were alive, all said to be anæmic. Apart from sore-throat and influenza on several occasions, there was nothing of importance in the history. The patient had been anæmic since girlhood, and had never been fit for much exercise or hard work. The weakness had been increasing during the past three years. Menstruation had been regular but somewhat excessive. Two weeks previously she had had a large uterine hæmorrhage, lasting three weeks. Four days before admission she had a small hæmatemesis, and on the night of admission she vomited about one pint of bright blood.

Her nutrition was satisfactory, but pallor was marked. There was no cyanosis, jaundice, or enlargement of lymphatic glands. The tongue was glazed and atrophic, and there were fissures at the angles of the mouth. The nails were slightly flattened and brittle. Temperature was normal, pulse-rate 90, blood pressure 126/58, and the apex-beat at the fifth interspace four and a half inches from the midline. Systolic murmurs were heard at all areas. The spleen was palpable three fingers-breadth below the costal margin. The liver was not enlarged.

Mr. G. S. Davidson reported: "I could find no enlargement of the uterus or any polypus or other local condition to account for the hæmorrhage." Test-meal showed histamine-fast achylia. The red cell fragility test was normal. A blood count on March 7th showed R.B.C., 2,220,000; Hb., 30 per cent.; C.I., 0·68; W.B.C., 6400; reticulocytes, 3 per cent.; icterus index, 7·5; van den Bergh reaction positive indirect; and Wassermann reaction negative.

The patient was given grs. 90 of iron and ammonium citrate daily, and in one month the blood count was R.B.C., 5,560,000; Hb., 84 per cent.: W.B.C., 2800. Blood examination of two of the patient's sisters was made. In one no anæmia was found, while in the other the blood count was: R.B.C., 4,220,000; Hb., 48 per cent.; C.I., 0·57; W.B.C., 4070. A test-meal was given and histamine-fast achylia was found. No enlargement of the spleen was present and iron therapy was successful.

On Nov. 22nd the patient was readmitted to hospital in a collapsed state. Three days previously she had vomited about half a pint of blood. On examination the spleen was found to be enlarged three fingers-breadth below the costal margin. The liver dullness was slightly diminished. The blood count was: R.B.C., 3,690,000; Hb., 66 per cent.;. C.I., 0·9; W.B.C., 11,000; reticulocytes, 1 per cent. The patient continued to take iron, and deep X rays were given to the spleen in order to reduce its size, as a pre-operative measure. She was discharged on Dec. 16th to the convalescent home, and readmitted to the infirmary on Feb. 11th, 1933. She said that a week after her course of deep X rays her abdomen became greatly distended, but gradually became reduced in size again. The spleen was found to reach the umbilicus, and the liver dullness was diminished by two fingers-breadth. A lævulose tolerance test showed no diminution of liver function. The icterus index was 7·5, and the van den Bergh reaction positive indirect. The blood count was: R.B.C., 4,400,000; Hb., 93 per cent.; W.B.C., 2400. On Feb. 20th splenectomy was carried out by Prof. Learmonth. The spleen weighed 422 g. Convalescence was uneventful. The patient continued to take a maintenance dose of iron and reported regularly at the blood clinic. Her blood has been maintained consistently around R.B.C., 5,000,000; and Hb., 100 per cent.

CASE 3.—A married women, aged 41, admitted to the Royal Infirmary on Oct. 26th, 1932, complaining of weakness and breathlessness. There was no family history of anæmia, jaundice, or hæmatemesis. Personal history was satisfactory. Three years ago the patient began to feel tired and breathless on effort, and less fit for her housework. These symptoms have become progressively worse. During the past year she noticed that she had become paler, and that her ankles were swollen at night. Her periods had been regular but recently had become more scanty. There was no history of dyspepsia or gastro-intestinal hæmorrhages.

Nutrition was satisfactory, but the skin pale and somewhat lemon-coloured, and the tongue pale and atrophic. The temperature was normal, the heart-rate 72 at rest, and the blood pressure 132/74. The apex-beat was half an inch within the nipple line in the fifth interspace. Systolic murmurs were present at all areas. There was no enlargement of lymphatic glands anywhere. The spleen was enlarged three fingers-breadth and the liver two fingers-breadth below the costal margin. A lævulose-tolerance test showed no diminution of liver function. The icterus index was 5. Erhlich's aldehyde reaction to urobilinogen was negative. Test-meal showed achlorhydria. The Wassermann reaction test was negative. A blood examination on Oct. 27th showed: R.B.C., 2,630,000; Hb., 20 per cent.; C.I., 0·38; W.B.C., 2400; reticulocytes, 1·7 per cent.

The patient was given grs. 9 of ferrous chloride in tablet form daily, as a pre-operative measure. In four weeks the blood count had risen to R.B.C., 3,940,000; Hb., 65 per cent. The patient continued to take iron and reported at intervals, and on Jan. 4th, 1933, the count was R.B.C., 4,200,000; Hb., 83 per cent. Blood platelets numbered 693,000. On March 4th the blood count was R.B.C., 4,690,000; Hb., 85 per cent. It was decided that the time for operation had arrived, and accordingly *on March 9th splenectomy* was performed. The spleen weighed 430 g. Unfortunately the patient died two days later from acute pulmonary œdema.

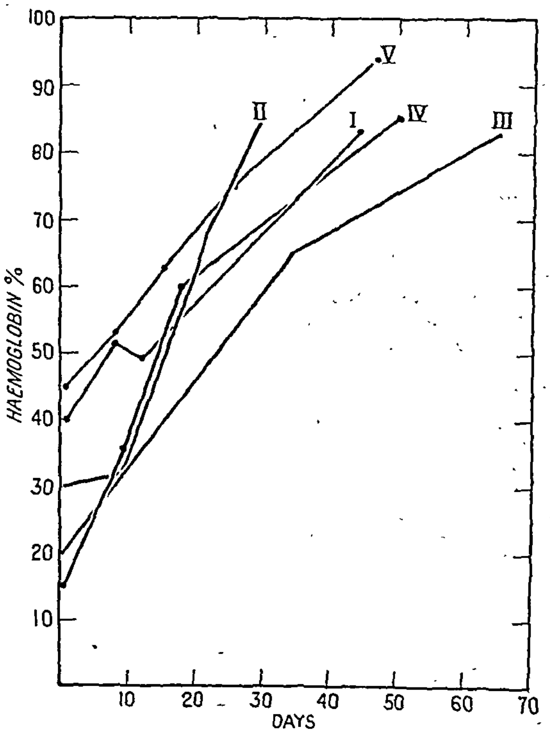
CASE 4.—Male, aged 8, admitted to the Royal Infirmary on Sept. 5th, 1933, complaining of pallor and weakness and vomiting of blood. The family history was satisfactory; there was no history of anæmia, jaundice, or tendency to bleeding. The previous history was also satisfactory. Until recently the boy's general health was stated by his doctor to have been good, although he was always somewhat pale. Five weeks before being admitted to hospital he developed a swelling in the left parotid region, which was not sufficiently large or painful to prevent his swallowing. A diagnosis of mumps was made by his doctor. He had no fever and stayed in bed only for a few days. During this time he was stated to have vomited some dark, tarry material, believed to be blood. Shortly after he got up he vomited a basinful of blood, red and partly clotted. Within the next 24 hours two further hæmatemeses occurred.

His nutrition was poor, with intense pallor, but no jaundice. His temperature was 100°, his pulse-rate 110, and his blood pressure 102/54. The apex-beat was 2¾ in. from the mid-sternal line in the fifth interspace. Systolic murmurs were heard at all areas. There was no enlargement of lymphatic glands anywhere except in the left cervical region, in the area draining the tonsil. The liver was just palpable, and the spleen extended three fingers-breadth below the costal margin. The red cell fragility test was normal, the icterus index 2·5, and the Wassermann reaction negative. A blood count on Sept. 5th showed: R.B.C., 1,400,000; Hb., 15 per cent.; C.I., 0·54; W.B.C., 3800, and very numerous platelets. He was treated with ferrous sulphate, grs. 6 daily, in tablet form. On Sept. 13th the count was: R.B.C., 2,660,000; Hb., 33 per cent.; C.I., 0·62; reticulocytes, 19·5 per cent. On Sept. 22nd the red cells numbered 3,500,000; Hb., 60 per cent. He returned home and continued to take the ferrous sulphate tablets. He was readmitted on Oct. 24th, when the blood count was: R.B.C., 4,780,000; Hb., 85 per cent.; W.B.C., 4000; reticulocytes, 1 per cent., and platelets, 160,000. Splenectomy was performed by Mr. F. K. Smith on Nov. 3rd, the spleen weighing 195 g. The operation was followed by transfusion of half a pint of blood. On Nov. 5th the patient developed a severe hæmoglobinuria, his hæmoglobin falling to 68 per cent. Otherwise convalescence was uninterrupted, and on the day the patient returned home (Nov. 16th) his blood count was: R.B.C., 4,290,000; Hb., 75 per cent.; W.B.C., 12,600. His doctor writes to say that he is back at school and in perfect health.

CASE 5.—Male, aged 32, admitted to Royal Infirmary on Dec. 28th, 1933, complaining of weakness and breathlessness on effort. There was no family history of anæmia, jaundice, or tendency to hæmorrhages. In childhood the patient had measles and whooping-cough, but not scarlet fever, diphtheria, or rheumatic fever. In 1921, at the age of 20, he had jaundice. It was not a severe attack, lasted only a few days, and was not accompanied by vomiting; he did not feel seriously ill. In 1926 his appendix was removed. Four months later he felt weak and ill. In September, 1927, he had a severe gastric hæmorrhage which caused him to faint. He was admitted to hospital on Dec. 27th, 1927, complaining of general weakness. A clear history of hæmatemesis and melæna four months before admittance was obtained. Blood count: R.B.C., 4,600,000; Hb., 85 per cent.; W.B.C., 5400. Examination of the abdomen showed a diminution of liver dullness, while the spleen was palpable. No ascites or enlarged veins were present. A diagnosis of Banti's disease was made, and on Nov. 8th splenectomy was performed by Mr. F. K. Smith. The spleen was enlarged and firm, with many adhesions posteriorly. The liver was hard and nodular. The pathologist reported: "The histological changes present are such as would correspond with Banti's disease." The patient kept well for some months but was readmitted to hospital in November, 1928, suffering from weakness and anæmia following a severe hæmatemesis. Between 1928 and 1933 he had at least five big hæmorrhages from the stomach.

Special Investigations in 1928.—Icterus index, 3·3. Lævulose-tolerance test: the blood-sugar rose from 100 to 146 mg. in one hour, denoting impairment of liver function. Radiogram of stomach and duodenum normal. Test-meal: normal acidity. Wassermann reaction negative.

The patient was first seen by me on Dec. 28th, 1933, when he was admitted under my charge complaining of weakness and breathlessness. The last hæmatemesis had occurred four months previously. Nutrition was satisfactory but pallor extreme. There was no jaundice or enlargement of lymphatic glands, but slight atrophic glossitis of the tongue. The temperature was normal; the pulse-rate 78, and the blood pressure 120/65. The apex-beat was within the nipple line in the fifth interspace. The liver dullness was markedly reduced. There were no enlarged veins and no free fluid in the abdomen. The lævulose-tolerance test was normal (despite the fact that cirrhosis of the liver had been known to be present for seven years). Bromsulphalein test showed definite impairment of liver function. The blood-urea was 23 mg. per 100 c.cm., the icterus index 6, and the Wassermann reaction negative. Blood examination on Dec. 30th showed: R.B.C., 3,150,000; Hb., 45 per cent.; reticulocytes, 1·6 per cent.; W.B.C., 7200. The patient was given grs. 90 of iron and ammonium citrate daily, and in six weeks his count was: R.B.C., 5,200,000; Hb., 94 per cent. ;W.B.C., 6000. The patient has recently reported at the blood clinic, looking and feeling in the best of health.



Graph illustrating the hæmoglobin percentage increase in five cases of splenic anæmia treated with iron.

PATHOLOGICAL EXAMINATION

The spleens were firm in consistence and grossly enlarged. No thrombosis of the splenic veins was found. Sections of the spleens removed from Cases 1, 2, 3, and 4 were examined by Dr. Duncan, pathologist to Aberdeen Royal Infirmary, and myself, and a diagnosis of splenic anæmia was made. The sections were subsequently examined by Dr. J. McMichael, University College Hospital, London, who has made a special study of diseases of the spleen, and who reports as follows: "Histological appearances in the spleens of Cases 1, 2, 3, and 4 correspond to those found in hepatolienal fibrosis. All the spleens showed periarterial hæmorrhage with organisation of the hæmorrhages leading to periarterial fibrosis. The venous sinuses showed definite dilatation, sometimes with moderate increase of collagen in their walls. (By hepatolienal fibrosis is meant that type of 'splenic anæmia' which is *frequently associated with hepatic cirrhosis*; but the pathological features are also found in the absence of gross cirrhosis—so-called 'pre-cirrhotic splenomegaly' or 'Banti's disease in the first stage')."

DISCUSSION

Several conclusions can be drawn from a study of the cases reported above and from the *Figure*. Iron therapy may be equally valuable in the splenic anæmia of (*a*) children or adults, (*b*) males or females, (*c*) as a pre-operative or post-operative measure. Obviously the response to iron treatment cannot be held to be a satisfactory test in the differential diagnosis of the various types of hypochromic anæmia accompanied by splenomegaly. The diagnosis of splenic anæmia, particularly in the early stages before gastric hæmorrhage or cirrhosis of the liver has occurred, is not always easy. The differential diagnosis depends essentially on a process of elimination. The following diseases, in which anæmia and splenomegaly occur, must receive serious consideration:

(1) Acute and chronic infectious diseases, with splenomegaly—e.g., infective endocarditis, malaria, and syphilis.

(2) Pernicious anæmia and the leukæmias, whose diagnosis depends on the presence of the characteristic qualitative changes in the red- and white-cell picture.

(3) The hæmolytic anæmias, such as acholuric jaundice, in which a raised reticulocyte level is present, with a stationary or falling blood level, the fragility of the red cells being usually, but not invariably, increased, and in which an increased serum bilirubin level and indirect van den Bergh reaction will be found. It must be remembered, however, that in the later stages of splenic anæmia a hepatitis may accompany the liver cirrhosis, in which case an increased icterus index and indirect van den Bergh reaction may be found (Cases 1 and 2).

(4) Idiopathic thrombocytopenic purpura. The platelet count in splenic anæmia is usually not decreased.

(5) The nutritional anæmia of women of the child-bearing age, in which a slight or moderate degree of splenomegaly is not infrequently found. As this is the commonest form of anæmia met with in this country, and one in which complete cure results from treatment with iron, it is very desirable that an accurate diagnosis should be made and that the patient should not be submitted to the serious risk of splenectomy.

Leucopenia is undoubtedly an important finding in splenic anæmia but is not always present. Moreover, a low white count is found in cases of nutritional anæmia: in a consecutive series of 100 severe cases 60 per cent. had a white cell count of 6000 or less. In both diseases achlorhydria may or may not be present. Four out of the last eight cases of splenic anæmia under my care had free hydrochloric acid in the gastric juice while the remainder were achlorhydric. Seventy per cent. of the above series of nutritional hypochromic anæmia were achlorhydric. The hypochromic anæmia in each condition is due to iron deficiency, since response to treatment with iron occurs without any alteration in the diet. Investigations carried out in Aberdeen in regard to the ætiology of the *nutritional anæmia* so frequently found in women clearly reveal that the cause of this iron deficiency was dependent on one or a combination of the following factors: (1) deficient intake of iron (high carbohydrate, low protein diet); (2) increased demands for iron (pregnancy and hæmorrhage); (3) decreased absorption of iron (achlorhydria). The same factors frequently play an important part in the production of the anæmia of splenic anæmia. The degree of splenomegaly in the simple nutritional anæmia is, generally speaking, less than in splenic anæmia, and treatment with iron results in the complete disappearance of the enlargement. In splenic anæmia treatment may result in some reduction in size, but I have never seen a spleen return to its normal size once it was definitely palpable.

From what has been said it is obvious that in early cases of splenic anæmia with slight splenomegaly, before hæmatemesis or liver cirrhosis has occurred, the diagnosis must remain in doubt. Accordingly it is advisable to institute iron therapy and watch the case over several months before operative treatment is seriously considered. Failure to do this has resulted in the unnecessary removal of the spleen in cases of simple nutritional anæmia. A gradual enlargement of the spleen and persistence of the leucopenia, despite iron treatment, favour the diagnosis of splenic anæmia.

Space does not permit me to discuss in detail the arguments for and against splenectomy as a therapeutic measure in splenic anæmia. Suffice it to say that there is no evidence that the anæmia is due to blood destruction, and therefore splenectomy cannot be advised for the reasons for which it is carried out in acholuric jaundice; nor is there satisfactory proof that the spleen harbours some infective agent, or that it has some toxic or inhibitory effect on blood formation. The most logical explanation for the beneficial effects claimed for splenectomy appear to rest on anatomical and mechanical foundations. Tying off the splenic artery and veins may be of value in relieving portal congestion and reducing the chances of hæmorrhages from the dilated gastric and œsophageal veins. Unfortunately, statistics show that 50 per cent. of patients with splenic anæmia who have had hæmorrhages before operation continue having them subsequently.

The real claim of the therapeutic value of splenectomy rests on the clinical observation and belief that operation is the best method available for improving the blood condition and prolonging the patient's life. Before this view could be held to be substantiated it would be necessary to compare a series of cases subjected to operation with a series adequately treated with iron and then followed up for many years. Unfortunately, evidence based on such a controlled experiment is wanting. The fact that individual cases have survived operation for periods of five, ten, or twenty years may be of little significance, since splenic anæmia is recognised to be a very slowly progressing disease, and every physician has had patients under his charge who have survived for ten years or longer without any surgical treatment.

It is difficult to understand why iron therapy is believed to be of so little value in splenic anæmia, but the two most probable explanations are (1) the exhibition of inadequate amounts of iron (it is only within the past few years that physicians have learnt once again the value of massive doses of iron) and (2) the estimation of the effects of iron in the treatment of cases of splenic anæmia during the terminal stages of the disease, when gross disturbance of the metabolic functions of the body are present and the bone-marrow is poisoned by toxic products.

In conclusion it may be said that whether one believes that operation is or is not indicated in splenic anæmia, treatment with effective doses of iron (iron and ammonium citrate, grs. 90 daily, Blaud's pills, grs. 45 daily, ferrous sulphate, chloride or carbonate in tablet form, grs. 9 daily) should be tried for at least six to eight weeks before iron therapy is held to have failed. Even in the late stage of the disease some benefit may be obtained. In cases which have not reached the stage of obvious liver cirrhosis, the blood level can always be raised and dramatic results are not infrequently produced, with such improvement in the general clinical state that the surgical risk and the liability to post-operative complications are markedly reduced. There can be little doubt that Case 1, who developed rheumatic fever and pericarditis two weeks subsequent to splenectomy, might have died if successful pre-operative treatment with iron had not been undertaken. Transfusion of blood, as a pre-operative or post-operative procedure, will be required much less frequently if adequate time is given to efficient iron treatment. Transfusion should be considered an emergency measure for raising the oxygen-carrying capacity of the blood, quickly and temporarily. Far from being a direct bone-marrow stimulant, it is the reverse, since by relieving the bone-marrow of its physiological stimulation to response (anoxæmia) it depresses function. The rise in the hæmoglobin level which results from increased activity of the patient's own formative tissues is far more valuable and permanent than the temporary rise which can be obtained by artificial means. After operation, iron treatment should be continued until a normal hæmoglobin value, if possible, has been obtained, and a small maintenance dose (ferrous sulphate grs. 3–6 daily, in tablet form) should be given. Iron is also of the greatest value in the treatment of the post-hæmorrhagic anæmia which follows hæmatemesis, whether this complication has occurred before or after operation.

DELAYED CHLOROFORM POISONING

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The existence of delayed chloroform poisoning seems largely accepted without question by the medical profession. As a student one is taught that such a condition may follow chloroform anæsthesia and cause death in about a week. In some quarters there is considerable opposition to the use of chloroform as an anæsthetic on any account; yet practitioners of 20 or 30 years' experience affirm that they have used it in thousands of cases without any detrimental effect as far as they could judge. Whichever view is held, there is agreement that delayed chloroform poisoning is extremely rare. The case recorded below has several unusual features.

Mrs. A., aged 25, was admitted to the maternity department for disproportion. She had had a dilatation and curettage 14 months previously for so-called endometritis. She had had no other trouble, and this was her first pregnancy. It was progressing normally, but the patient was uncertain about her dates. She was attending an antenatal clinic outside, and was referred to the maternity department because of apparent disproportion.

On examination the patient was seen to be in good general health, with a pregnancy about full term. The uterus was considerably larger than the normal full-term uterus and twin pregnancy was suspected. Only one fœtus could be distinguished on clinical examination and radiography showed a normal vertex presentation with the head engaged. The distension was presumed to be due to excess of liquor. The blood pressure and urine were normal. Induction of labour was decided on in view of the patient's mechanical distress and her uncertainty about her dates. A stomach-tube was introduced into the lower uterine segment the day after admission, under chloroform and ether anæsthesia. The induction of anæsthesia was with a mixture containing one part of chloroform and two parts of ether, and the maintenance was with pure ether. The whole procedure was short and the anæsthetist estimated that not more than 4 drachms of chloroform were used.

On coming round from the anæsthetic the patient vomited once, but she was then quite fit until the following day when she vomited several times. Labour had not commenced 40 hours after the induction, so quinine grs. 5 was given intramuscularly (in view of the emesis). Twelve hours later the tube was removed and the membranes were ruptured. Morphia, gr. ¼, had been given on both nights so far, and the patient's condition was satisfactory except for the anxiety the vomiting was causing. This progressed, however, and could not be checked. After the rupture of the membranes labour did commence but advanced very slowly, the cervix being only at half a crown dilatation at the end of 24 hours. The patient drowsed fitfully during the third day. The next morning, approximately four days from the time of the induction, she became comatose. The coma became quite deep very soon, and no response could be obtained to stimulation. For the first time the urine contained a trace of albumin, and ketones were also present. The pulse-rate became much more rapid and the pulse feeble, and two pints of gum saline with 200 c.cm. of 50 per cent. glucose were given intravenously. This was followed by continuous intravenous infusion of 10 per cent. glucose in saline. After three hours the patient gradually came out of her coma and could just respond to questions by movements of her head. Her general condition remained very poor and, in spite of the continued intravenous therapy, she died just over 100 hours from the time the anæsthetic was administered. There was no suggestion of jaundice during life, but after death the skin appeared slightly icteric.

Post-mortem examination showed a normal full-term pregnancy with labour advanced so that the cervix was just over half dilated. The fœtus was commencing to peel. There was no abnormality in the pelvis. There was some œdema of the base of both lungs. There was obvious cloudy swelling of the kidneys, but no evident necrosis or hæmorrhages. The liver was of normal size, but showed considerable wrinkling of the capsules and marked focal fatty change. Macroscopically the liver resembled what one would expect in a case of delayed chloroform poisoning, and microscopical examination of sections confirmed this view. There was generalised fatty degeneration and occasional microscopic hæmorrhages. The bulk of the liver cells were necrotic, the only cells relatively unaffected forming a small peripheral zone of the lobule, and even these showed cloudy swelling. The picture was that of an extensive central necrosis. The sections of the kidney showed a very marked generalised cloudy swelling, but nothing else was definite.

An alternative diagnosis from the microscopical picture alone would be necrosis due to intense sepsis, as in septicæmias or some varieties of general peritonitis. Neither of these possibilities was present and the diagnosis of chloroform necrosis is, I think, secure.

DISCUSSION

The features of most interest in this case were the occurrence of poisoning after an exceptionally small amount of chloroform, the absence of any convulsions or jaundice, and the temporary recovery from coma after massive intravenous glucose therapy. It will be remembered that the patient had had a similar general anæsthetic 14 months previously for a dilatation and curettage. She had had no post-operative symptoms on that occasion. Even had chloroform poisoning been threatening then but recovered from, there is no reason to presume any permanent damage.[1]

I have the impression that there was probably a marked idiosyncratic factor, in view of the rarity of chloroform poisoning even in cases where prolonged anæsthesia had been maintained with pure chloroform. D. N. Paton quotes the experiments of Whipple and Sperring on dogs, where they showed a wide variation in individual susceptibility, and stated that chloroform anæsthesia maintained for 35 minutes can cause fatal poisoning with almost complete liver necrosis. In the same paper he concludes that the experimental evidence points to the primary action of chloroform being due to its fixation by tissue cells, the degree of fixation depending upon the vascularity of the tissue and its lipoid content: and to its power of checking and finally stopping the processes of oxidation in them—thus ultimately killing them while accelerating the disintegrating necrobiotic processes which are the cause of late chloroform poisoning. The brain cells are most sensitive to anoxæmia; this fact, and the enormous blood-supply to the grey matter carrying the chloroform abundantly to the brain cells, explains the loss of consciousness. The remaining symptoms can be appreciated as due to the liver necrosis.

The most recent publication on the subject is a case report by Stander.[2] He remarks that as little as 2 oz. of chloroform used to induce surgical anæsthesia is sufficient to produce delayed poisoning. (In the case reported here certainly not more than four drachms were used.) He also comments on the fact that jaundice need not necessarily develop. He considers that the only place for chloroform anæsthesia in obstetrics is late in the second stage when it should be administered in whiffs with an abundant supply of air; even then it is not advised. Munro Kerr[3] remarks that it has taken several generations to stamp out the idea that chloroform is a safe anæsthetic in labour under all circumstances. While admitting its utility in domiciliary practice, he condemns its use in the presence of any variety of toxæmia or in prolonged labour. He advocates the substitution of local anæsthesia in carrying out an episiotomy or repairing a torn perineum. He insists that in all cases it is desirable to reduce as far as possible the amount of chloroform used.

The recent prominence given to the use of chloroform capsules during labour focuses attention once more on the possible idiosyncratic factor in chloroform poisoning. These capsules contain ♏20 of chloroform and it is not usual to use more than three. In other words, one drachm of chloroform is about the average. Rivett[4] states that capsules have been used in about 4000 cases without any fœtal or maternal death due to the chloroform. Certainly this statement should carry sufficient weight to exclude the existence of any marked idiosyncratic factor. The fact that a pregnant woman in a good condition of general health can die from acute liver necrosis four days after receiving less than 4 drachms of chloroform in mixed anæsthesia forces one to consider the existence of a definite pregnancy factor which can disorganise normal liver metabolism to such a degree that a small dose of poison can produce a general necrosis. It is known that fatty infiltration occurs in the central portion of the liver lobules in the later months of pregnancy, and this explains the occurrence of central zonal necrosis due to chloroform. Possibly the elucidation of the true ætiology of the toxæmias of pregnancy is more intimately associated with a fuller understanding of liver metabolism than has hitherto been realised.

I am indebted to Mr. K. M. Duncan, senior surgeon to the Royal Infirmary, Preston, for permission to publish this case.

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COLLES'S FRACTURE

By Simon Holzman, M.B. Lond.

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Usual descriptions of the Colles fracture emphasise the break of the radius, generally oblique, and may add the injury to the ulnar styloid or its ligament. They lay no stress on the possibility of carpal displacement; yet of 26 cases treated at the Coventry and Warwickshire Hospital under my observation, two-thirds showed a complete break of the styloid process and this is an injury which immediately produces, or tends to produce, a radial displacement of the carpus relative to the separately displaced lower end of the radius. Fragmentation of the tip of the ulnar styloid process was seen in a few cases, and none of the 26 patients is likely to have escaped severe trauma of the internal lateral ligament.

The cases clearly demonstrated that deformity not infrequently develops after reduction—contrary to the accepted views, but in conformity with the experience of some of my colleagues. This may happen in at least two ways. For example, the radius may be maintained in position but owing to the fractured ulnar styloid the carpus slips radially (Case 1, Fig. 1); or the displacement of the radius may recur gradually after removal of the splint, as clearly illustrated in Case 2 (Fig. 2). In this case, at the third week, when the plaster was removed, there was no sign of radial deformity. No further support was given to the fracture but a gradual return, and then exaggeration, of the original deformity took place. Minor degrees of redisplacement were noted in other cases despite the fact that at the second week, when splintage had been discontinued, the wrist appeared normal in shape. Four of the cases were treated with a skeleton type of splint on the lines of a Delbet. The fractured radius was supported by a plaster cuff, steadied in position by a narrow ulnar strip held at the upper end of the forearm by a turn of Flexoplast (Case 1). About 40° of painless passive flexion and 40° of extension of the wrist were possible at the tenth day. The range of movement then only slowly increased and the final results were fair in two and poor in two. A radiogram of one of these (Case 1, Fig. 1 c) showed that the radius was maintained in position, but the ulnar styloid process was fractured and the carpus had slipped to produce a radial deformity of the wrist, with consequent weakness and delay in recovery.

These two important causes of failure to obtain a perfect result caused me to review my own and other methods of splinting and after-treatment. I am now using an unpadded plaster splint, which is based on the displacements occurring in this injury and the principles of the separate methods in use. The after-care was similarly evolved from these sources.

The splint I use consists of an encircling plaster covering a little more than the lower two-thirds of the forearm and extending to the metacarpal bases (Fig. 3). It is applied with the wrist in flexion and ulnar deviation. The wrist, still being kept in ulnar deviation, is then a little dorsiflexed. An anterior plaster strip is added. This extends to the distal palmar crease and more laterally to the thumb metacarpophalangeal joint. It is moulded to the palm of the hand and its borders.

Active movements can be readily carried out as the fingers are free, the wrist is in the position of function from the beginning, and an appreciable amount of extension is possible with much (and increasing) pronation and supination. The fractured end of the radius is held in position and the fractured ulnar styloid, or sprained ligament, is held relaxed. The splint is removed in three weeks and, as recurrence is possible even after this period, I then use an unpadded moulded plaster cock-up splint, which is worn at night only. Its use then counteracts the daytime tendency to displacement, prevents unconscious strain, and without exception allows greater ease of joint movement in the morning. It earns the gratitude of patients, who without it are in constant fear of being seriously injured when asleep.

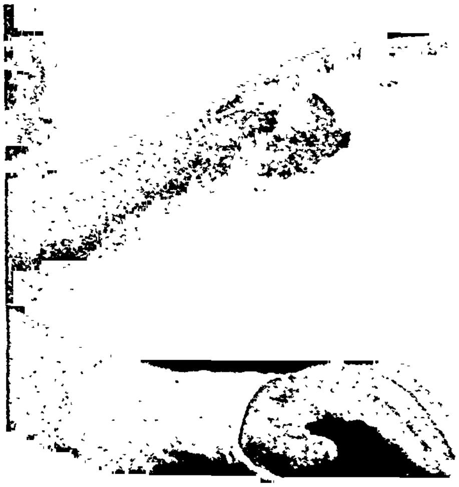
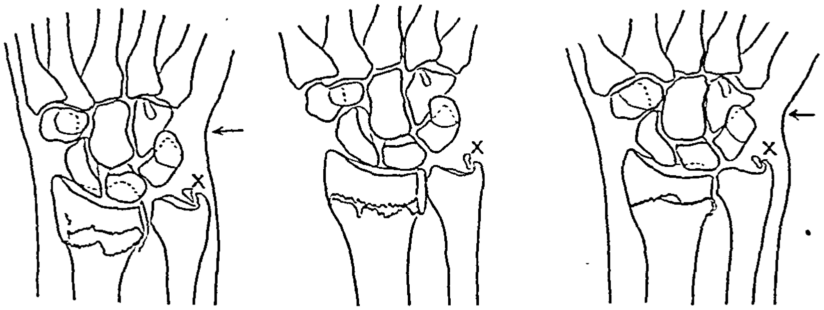


FIG. 3.—Photographs of the splint.

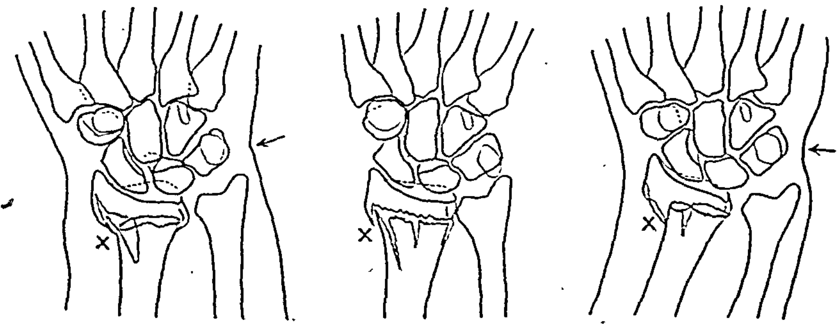
Careful after-treatment is an essential of success. It is the summation of gradually increasing active movement, which, if conscientiously carried out by the patient, hardly needs the aid of massage (Case 3). A useful list of exercises is enumerated in Böhler's book,[1] and I also use the following exercises in conjunction with those advocated by him: towel-wringing, for pronation and supination; squeezing of a Sorbo ball; walking fingers up the wall; turning of handles; and later the use of a mincing machine or mangle. For the first three weeks the hand is in the plaster splint described, and generally without a sling. The plaster splint must then be replaced by the anterior plaster shell, to be used at night for as long as the patient wants it. The treatment of the uncommon refractory case is supplemented by massage, ionisation, diathermy, radiant heat, or infra-red irradiation—in order of preference.

Direct contact with the cases has served, even more than the figures, to emphasise the advantages of the splints and after-treatment described. I was impressed by the quick recovery and negligible massage requirement, criteria which on further consideration were overshadowed by the uniform absence of any but the slightest deformity (despite the patients' high average age of 58), and a freedom of movement on discharge, usually almost equal to normal. I do not consider lack of deformity in this fracture purely an æsthetic consideration, important as this factor could easily be, but as the joint surfaces are again relatively normal, the not uncommon painful joint should be almost obviated and this, together with the freedom of movement, suggests that a continued excellent functional result is probable.



(a) Before reduction. (b) After reduction. (c) Five weeks later.

FIG. 1.—Drawings from radiograms in Case 1. The arrow indicates the visible deformity at the wrist; the cross shows the fracture producing the deformity.



(a) Before reduction. (b) After reduction. (c) Nine weeks later.

FIG. 2.—Radiograms from Case 2.

The following are illustrative cases :—

CASE 1 (Fig. 1).—Female aged 51. Treatment 11½ weeks. The fractured radius only was supported, the joint being left free for immediate active movement. The deformity was first noticed at the 36th day and radiography then showed that there was no lateral displacement of the radius, but that the clinical deformity was due to the carpus. Its ulnar attachment had become elongated, allowing it to tilt over to the radial side. The displacement progressed during treatment and was very much more conspicuous on discharge.

CASE 2 (Fig. 2).—Female aged 63. Treatment 9 weeks. The joint as well as the radius was supported for three weeks and the wrist then being almost normal in appearance no further support was given. Radial deformity became apparent and gradually increased until at discharge it had become very obvious. Lack of tendency to redisplace is considered a feature of this fracture but at least one of my colleague's cases was even more markedly affected in this way.

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[1] Böhler, L.: Treatment of Fractures, Vienna, 1929.

CASE 3.—Female aged 51. Treatment 6 weeks. Hers is the most recent of the cases treated strictly in accord with the method described. The result is excellent. She has 80° of supination and 90° of pronation. The joint looks perfectly normal, there is no pain, and she is able to do work as hard as the washing of all her clothes.

The remaining cases treated in the same way were older and produced results almost as good as this one.

CLINICAL AND LABORATORY NOTES

ERYTHEMA NODOSUM

TREATED WITH ANTISTREPTOCOCCAL SERUM

By Gerald Slot, M.D., M.R.C.P. Lond., D.P.H.

SENIOR PHYSICIAN, ROYAL WATERLOO HOSPITAL, AND ROYAL HOSPITAL, RICHMOND; PÆDIATRICIAN, AND PHYSICIAN IN CHARGE OF RHEUMATIC SUPERVISORY CENTRE, LONDON COUNTY COUNCIL

THE cases here recorded suggest that antistreptococcal (scarlatinal) serum is a valuable means of treatment in erythema nodosum. Case 4 was the most striking, but in all the others there was rapid improvement, with less constitutional disturbance than would have been expected with previous methods of treatment. The trouble subsided in each case within 24 hours, and the only sign of reaction was in Case 3, where the patient had mild transient joint pain and pyrexia eight days after the last injection. The improvement obtained by the use of this serum seems to bear out the view that the cases were all streptococcal in origin, especially as in all of them there was sore-throat from one to four days before the appearance of the eruption. I realise that in Case 1 gold might have been blamed, especially as the eruption was profuse and widespread but, apart from the aurotherapy, the case does not seem different from the others; there was a preceding tonsillitis and the temperature subsided on the administration of serum.

CASE 1.—Married woman, aged 49. Admitted for arthritis and treatment by aurotherapy. On Feb. 7th 0·05 g. of Myocrysin was injected intramuscularly; she vomited twice on the following day. On Feb. 13th and 16th 0·1 and 0·2 g. respectively were given. On Feb. 17th she developed follicular tonsillitis; swabs showed micrococci and *Oidum albicans*. On Feb. 21st she developed an extensive erythema nodosum on the legs, forearms and buttocks and along the spine. She had a temperature during the last four days varying between 100° and 102°. On Feb. 26th 10 c.cm. of antiscarlatinal serum was given, and the temperature fell to normal within 12 hours; the rash faded simultaneously and by March 9th the erythema nodosum had cleared. It should be mentioned that in view of the possibility that gold was a factor in this case, she was also treated with Ametox, a preparation of sodium hyposulphite.

CASE 2.—A married woman, admitted on March 27th with erythema nodosum and hæmorrhagic nephritis. The urine and clinical picture were typically those of toxæmic kidney containing blood and albumin, but cultures were sterile. There was no history of sore-throats; the tonsils were small and slightly infected. Her temperature was 101°. She had had rheumatic fever some years before; the date is somewhat uncertain and she had had pains in her joints at times since. The erythema nodosum was typical; raised, red, tender patches extended from the knee to the ankle on the anterior surface of both legs. Besides the appropriate nephritic diet she was treated with 20 c.cm. of antiscarlatinal serum intramuscularly on March 28th. The temperature fell to normal on April 1st. It was noticeable that the rash gradually disappeared after the injection, and by April 2nd had disappeared completely. The nephritic condition cleared up and she was discharged completely well on April 21st.

CASE 3.—A married woman, aged 37. Fourteen days before admission she had tonsillitis with herpes labialis; this was followed by painful red swellings on the shins and thighs and pains in the joints, which were stiff but not appreciably swollen. On admission to hospital the joints were all normal, but there were several areas of erythema nodosum on both legs. Antiscarlatinal serum was given, and in two days the eruption had cleared up. On the eighth day she had a slight pyrexia and some joint pains, possibly due to a serum reaction; otherwise she rapidly improved, and in nine days the rash had completely disappeared. The heart and lungs were clinically normal and there was no suspicion of tuberculosis either in her history or on examination.

CASE 4.—A boy, 10 years old, was admitted under the care of my colleague, Dr. Cecil Bull, to whom I am grateful for permission to mention this case. This child had tonsillitis, which was followed four days later by extensive erythema nodosum on both legs, joint pains, malaise, and a temperature of 100°. The heart and lungs were clear. Ten c.cm. of antistreptococcal serum was given; the temperature dropped immediately to normal and the whole condition cleared up in four days.

The ætiology of erythema nodosum is still obscure. Full accounts and discussions of the various theories have been written recently by Collis [1] and by Pierre Fornara.[2] The three main views held are:—

(1) That it is a specific infection or an affection sui generis. This view has been advanced by writers from Trousseau onwards and has the support of Robert Hutchison, who in a personal communication quoted by Collis states that he believes it is a nodal fever. E. C. Rosenow claims to have found a specific organism which gains entry to the body through the tonsils and, although cases have been reported in the same family, this is extremely rare and the disease is not contagious.

(2) Many authorities believe that it is a manifestation of tuberculosis, and this view is widely held by the French and Swedish schools. Collis believes that the majority of cases fit into this group and has brought evidence that many give a positive reaction to one or other of the tuberculin skin tests and that in children the hilar glands are frequently enlarged. It is further stated that if no evidence of tuberculosis is found at the time of the eruption when followed up, many of these cases will be found to develop clinical evidence of disease at a later date.

(3) That it is a manifestation of rheumatism. This is supported by the fact that tonsillitis and joint pains may precede or accompany the eruption, and that it may be followed in a percentage of cases by cardiac lesions. These facts have led to the belief that erythema nodosum is but one of the variant manifestations in which rheumatism may attack the body. Its association, however, with active cardiac lesions is very uncommon, and its association with sore-throat and joint pains, while admittedly suggestive of a rheumatic origin, can only so far be regarded as a manifestation of the toxæmia with a primary source of infection in the throat.

(4) That it is a manifestation of toxæmia, not due to a specific organism but as a reaction to various types of toxin; hence it may be due to tuberculin in one case and to a streptococcal infection in another.

In London, at any rate, the majority of cases seem to be due to a streptococcal infection and not to tuberculosis, and the treatment and results described offer support of this view.

I would like to express my thanks to Dr. P. M. Deville, medical registrar to the Royal Waterloo Hospital, for much help in the compilation of this note.

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[1] Collis, W. R. F.: Quart. Jour. Med., 1932, i., 141.

[2] Fornara, P.: Rev. Franç. Péd., 1930, vi., 723.

ANEURYSM OF THE FEMORAL ARTERY

By F. D. Saner, F.R.C.S. Eng.
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Mrs. A. was referred to me by Dr. I. W. Laing on account of a painful tender swelling of the left thigh. On May 2nd she had developed tonsillitis followed by some enlargement of a gland in the neck. The temperature, which was unusually high, did not drop as the local condition improved, so she was admitted to hospital. After some ten days the temperature became normal, but being rather weak she was kept in hospital a further two to three weeks. The diagnosis was "influenza and tonsillitis." On discharge from hospital the gland in the neck had not entirely cleared and a few days after her return home a small abscess formed which was treated by her doctor and healed uneventfully. During the latter part of her stay in hospital and also at home there had been pain and aching in the left thigh; this being attributed by the patient to "rheumatism" was not mentioned until June 12th when the thigh began to swell. During the next two days the swelling rapidly increased in size, the pain was severe, and there was some rise of temperature, 100°–101° F. On the 15th admission was arranged to the private section of the Royal Northern Hospital.

The temperature on admission was 100·6° F., the pulse-rate 100. The patient, a spare woman, looked ill and complained of considerable pain in the left thigh, described as throbbing in character. The throat appeared normal, the neck was clear, and there was no evidence of any lesion in the chest or abdomen. On examination of the thigh a large rounded swelling (some 4 in. by 4 in.) was seen mainly on the inner aspect and towards the front of the junction of the middle and lower thirds. Except for engorgement of several big veins on the surface the skin was normal in appearance, it was not hot nor œdematous. The mass itself was dense, apparently confluent with the inner aspect of the bone, and very tender; on pressure there was thought to be deep fluctuation. There was no pulsation in the mass nor was it pulsatile, no thrill was felt; the temperature of the legs and feet appeared to be about the same, while the pulses at the ankles were thought to be equal; but, admittedly, sufficiently close attention was not paid to elicit any difference. Nor was a bruit listened for in the thigh.

Next morning the local condition was about the same; there was, however, a further slight rise in the temperature and pulse-rate, while through the night, in spite of sedatives, sleep had been considerably curtailed by pain. In radiograms taken of the thigh no abnormality could be detected of the bone or soft tissues. It was decided to advise that the swelling be explored. Under general anæsthesia an exploring needle was inserted in two or three places near its centre, but except for a little serum nothing could be extracted. A small incision was then made through the skin and muscle sheath when on separation of the muscle-fibres there was a rapid escape of blood clot followed by a gush of blood obviously from the main vessel. The wound was packed while the artery was exposed in Scarpa's triangle—pressure on which was found to control the hæmorrhage—and ligatured immediately below the origin of the deep branch. The original incision was left open.

Though during the next 48 hours the circulation in the leg was maintained, the foot and ankle remained cold and white from the time of the operation and gradually became discoloured. On the third day after the operation the discoloration was spreading up the back of the leg and since the pain in the thigh itself was undiminished and the general condition depreciating, amputation was advised and performed, but was survived only by a few hours. During the amputation as the muscles of the thigh were divided further blood clot was liberated together with some two or three drachms of pus.

The following is a description by Dr. Sholto Mackenzie of the post-mortem findings in the leg:—

About 1 in. distal to the point at which the femoral artery emerges from the adductor magnus there is a fusiform dilatation of the vessel wall some 2½ in. long and 1½ in. wide with a perforation on the anterior wall at its centre. This dilatation on opening proved to be an aneurysm in which the coats of the vessels were split, resembling in this respect a dissecting aneurysm. Immediately posterior and lateral to the aneurysm is an abscess cavity containing about 2 oz. of pus, but there is no obvious communication between the two. The vessel below the aneurysm was full of ante-mortem clot.

The provisional diagnosis before the exploration was that the condition was an inflammatory one—which proved correct to a point—but the absence of heat or œdema of the skin threw some doubts on the diagnosis. As an alternative there was the possibility of it being an aneurysmal swelling which, however, appeared to be excluded by the complete absence of pulsation or thrill; the presence of a combination of the two was not suspected and permission therefore for an amputation was not sought in the first instance.

It seems probable that during the original attack of tonsillitis a septic embolus lodged in the wall of the femoral artery producing an abscess in the vessel itself and its immediate surroundings.

TRYPAN-BLUE INTRAVENOUSLY IN POST-ENCEPHALITIC PARKINSONISM

By W. McCartan, M.D. Belf., D.P.H., D.P.M.
FIRST ASSISTANT MEDICAL OFFICER, WEST PARK MENTAL HOSPITAL, EPSOM

An annotation appeared in The Lancet of June 18th, 1932, summarising the work of Laignel-Lavastine and Jean Sterne [1] on the treatment of the parkinsonian sequelæ of epidemic encephalitis by trypan-blue. This publication was later reprinted [2] but has apparently received little attention in this country, and some observations on the use of the dye in similar cases may be of interest.

At West Park there are a number of patients suffering from post-encephalitic parkinsonism, this being one of the receiving hospitals for London. Most of the patients here have been on substantial doses of tincture of stramonium for some years and this was not withdrawn during the intravenous therapy, since Laignel-Lavastine and Sterne had continued to give scopolamine to their cases and since withholding stramonium rapidly reduces these unfortunates to a much more pitiable state.

A supply of the dye ("purified for physiological purposes") was obtained from British Drug Houses Ltd., and intravenous injections were commenced on three female patients, starting with very small doses and working up to 1 c.cm. Temperature, pulse, and blood pressure were carefully watched but no response of any sort was obtained. It was then felt that one might embark on a larger scale and 11 male patients had several series of injections.

In each case the first series was given in doses of 1 c.cm. at intervals of four days and was discontinued when there was definite evidence of a bluish tinge of the skin. This was noticed along the hair margin of the brow first and cleared up in about a week following the last injection of the series. In subsequent series one felt a little less cautious perhaps and, after an initial injection of 1 c.cm., continued the series in 2 c.cm. doses adhering to the four-day interval which the French workers recommend between each injection. With the 1 c.cm. doses the appearance of the bluish coloration of the skin was very insiduous and in the first patients treated 10 injections were given in the first series before one satisfied oneself that there was a definite tinting of the skin but in later cases 5 or 6 in the first series were the rule. Two months' rest was given between each series. Two patients had 23 injections in all, two had 22, one had 21, one had 20, three had 17, one had 16, and one had 14. These were given in three series except in the case of the patient who had 16 injections and whose injections were discontinued permanently at the end of the second series since his debilitated state did not encourage one to press a new remedy.

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[1] Laignel-Lavastine, M., and Sterne, J.: Bull. et mém. Soc. méd. hôp. de Paris, 1932, xlviii., 689.

[2] Same authors: Jour. de méd. de Paris, 1933, liii., 14.

The results, apart from an initial feeling of improvement in a few cases in the early stages of the treatment (which was probably largely due to suggestion), were disappointing. None of the patients showed the least benefit. The fact that these results fall so far short of those of Laignel-Lavastine and Sterne may, of course, be explained on the grounds that the treatment was not continued for a sufficiently long period, but it is to be remembered that with these workers the second or third series usually opened up an improvement. Had a single patient at West Park shown any improvement the treatment would have been continued. But vital dyes have frequently been used experimentally to block the reticulo-endothelium and have been shown to seriously impair the production of antibodies,[3] so that the prolonged use of a cumulative substance with this property must surely be fraught with the risk of intercurrent infection.

On the rationale of the treatment Laignel-Lavastine and Sterne are silent. Trypan-blue is known to have a high toxicity for trypanosomes and it has been used in canine piroplasmosis (malignant jaundice). During the late war it was used in certain German military hospitals in the treatment of malaria. Its germicidal activities can, however, hardly be of much use for the relief of post-encephalitic parkinsonism.

Lubin Popoff, in a paper entitled "Resultats obtenus par le bleu de trypan en injections intraveneuses dans certain affections bulleuses,"[4] assumes that the beneficial action found by Laignel-Lavastine and Sterne is to be explained by blockage of the reticulo-endothelium. How that is likely to relieve the parkinsonian syndrome is a little difficult to understand.

Dr. N. Roberts, medical superintendent of West Park Mental Hospital, is to be thanked for permitting me to publish observations on these cases.

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[3] Boyd, W.: Pathology of Internal Diseases, London, 1931, p. 671.

[4] Popoff, L.: Bull. de Soc. franç. de derm. et syph., 1933, xl., 673.

REVIEWS AND NOTICES OF BOOKS

The Principles of Heating and Ventilation

By H. M. VERNON, M.A., M.D. London: Edwin Arnold. 1934. Pp. 232. 14s.

THIS valuable book deals with the borderland between physics and physiology. The requirements of modern communities in the matter of warmth and fresh air are much more exacting, both in the home and in the office and workshop, than they were 50 years ago. The development of sources of warmth other than the open fire, and the fierce competition between them, on the one hand, and the British love of fresh air, even indoors, which complicates continental travel, on the other, have stimulated technical advances which have been adequately described. But the principles underlying heating and ventilation have recently been well studied, and Dr. Vernon's monograph is successful in welding into a connected whole the basic information scattered in various journals, including a good deal of original work done by himself.

The author first describes the various devices used by himself and others to supplement the mere determination of air temperature as an indication of the suitability of conditions in room, office, or factory for comfort and efficiency, passing on to consider various systems of heating and ventilation. Since under average conditions radiation accounts for about one-half, convection for one-third, and evaporation for one-fifth of the heat losses of the body, the value of instruments like Hill's kata-thermometer, Dufton's eupathoscope, and the author's globe thermometer, which enable with some precision the effect of any actual set of atmospheric conditions on the human body to be estimated and standards to be laid down, is evident. The heat losses through the walls and other surfaces of buildings are considerable; it is interesting to note that whilst a plain brick wall 9 in. thick will transmit 0·358 of a British thermal unit per hour for each square foot of surface, the difference of temperature being kept at 1° F., and a wall double the thickness transmits 0·218 B.T.U., the transmission of the thinner wall can be reduced to 0·103 by half an inch of plaster on cork-board set in half-inch cement. Concrete walls 12 in. thick transmit more heat than 9 in. brick, as also do stone walls. Stout paper covered with aluminium foil has been found to be an excellent thermal insulator for roof linings and similar purposes.

The costs of heating by various means are often in dispute. According to A. H. Barker, quoted by the author, although the cost for continuous heating by gas fires was more than twice that for coal fires in a seven-roomed house with a calculated heat loss of 87,000 B.T.U. per hour, when regard was paid to the actual times for which the fires were kept running over a period of six months, and the extra cost of cleaning and redecoration for coal-fired rooms, the advantage turned slightly in favour of gas. The various kinds of radiators, including those which are mainly convectors and air warmers as well as those which act mainly by radiation from surfaces heated by hot water or electricity, are described and their merits or demerits discussed. In a chapter on the necessity for ventilation, Dr. Vernon shows how ventilation and heating are inseparably connected. Without ventilation heating leads to discomfort, not because of the toxic effects of the products of respiration, but because the air becomes unbearably hot and humid. He has an interesting paragraph dealing with the effects of occupation on the ionisation of the air. We doubt, however, if he is right in speaking of (p. 142) "condensation nuclei such as particles of dust or smoke." Dust particles do not act as condensation nuclei, as air may be freed from Aitken nuclei while retaining its dust content. Equally adequate are the chapters on ventilation for dwellings, factories in which special industries are carried out, and places of amusement, and the discussion on air conditioning.

The book should be useful to all who have to advise on heating or ventilation as affecting the comfort and efficiency of human beings; it may be helpful also to experts whose knowledge is technical rather than fundamental. It is written in a very readable style and well illustrated.

Essentials of Infant Feeding and Pediatric Practice

By HENRY P. WRIGHT, B.A., M.D., Lecturer in the Department of Pediatrics, McGill University; Physician-in-Chief to the Montreal Children's Hospital. London: Humphrey Milford, Oxford University Press. 1934. Pp. 212. 12*s.* 6*d.*

IN the preface the author states that an attempt has been made to present the modern teaching of pædiatrics in a practical manner for the benefit of the trained nurse, the student of medicine, and the general practitioner. It is perhaps unfortunate that he did not direct his attention more particularly to any one of the three, or else considerably enlarge the scope of the book. As it stands, the sections devoted to disease in childhood are so sketchy as to be of little practical value in either the treatment or understanding of the condition described, or even (to take the basest view) in answering an examination question. Infant feeding, on the other hand, is dealt with more fully, and an excellent summary of the modern views and methods is given. Here again, however, the book fails owing to lack of a definite objective; neither nurse, student, nor practitioner is likely to want a table of values of the mineral ash composition of human and cow's milk given to three places of decimals, whilst even this section is insufficiently full to serve as a book of reference. For instance, the post-operative care and feeding of cases of pyloric stenosis is dealt with briefly and inadequately. It is regrettable that the very real merits of the book, which is clearly based on wide reading and careful assimilation of the best modern teaching of the subject, should be obscured in this way, and it is to be hoped that if a revision of the book is subsequently undertaken, the whole volume will either be devoted exclusively to infant feeding or else considerably enlarged.

Vital Cardiology

By BRUCE WILLIAMSON, M.D., M.R.C.P., Physician, Royal Northern Hospital, London. Edinburgh: E. and S. Livingstone. 1934. Pp. 344. 15*s.*

THE theory of medical practice to-day is based largely on hypothesis, and there is always a danger that hypotheses which are no longer in accordance with the facts may outlive their usefulness because they have been put forward in earlier days by some eminent authority. On the other hand, there is a tendency for new methods both in diagnosis and treatment to attract more attention than is their due, until eventually with lapse of time they find their true level. In this volume the author maintains that the orthodox methods of cardiology as practised to-day are fundamentally wrong, and that we must revert to simpler ideas, if we are to put the subject once more upon right lines. His thesis is that heart rate and heart force (by which he appears to mean stroke-volume) are the only two things which really matter and that all other considerations are of secondary importance. He endeavours to obtain support for this thesis from the teaching of Sir James Mackenzie; but he seems to forget that Mackenzie was in his prime more than a quarter of a century ago. During those 25 years knowledge has considerably advanced, and diagnostic methods such as electrocardiography and radiography of the heart, which were then in their infancy, have now made good and won for themselves a permanent place in clinical medicine. To shut one's eyes to these advances is to adopt an attitude of mind which ignores progress, an attitude which Mackenzie would have been the first to condemn.

Dr. Bruce Williamson's book contains much sound practical advice from the clinical aspect, but it also contains a great deal of arm-chair philosophy which is without scientific basis. Dr. Williamson holds rather unusual views on cardiology and has written this book in defence of these views, but it fails to carry conviction.

Volumetric Analysis

By H. P. STARCK, M.A. Cantab., Head of the Science Department, Technical College, Kingston-on-Thames. London: Baillière, Tindall and Cox. 1934. Pp. 228, with an appendix on Qualitative Analysis (pp. 31). 7*s.* 6*d.*

VOLUMETRIC analyses cannot be made unless the apparatus has been freed from grease and has been calibrated. Any good book on the subject must emphasise these preliminaries and describe how they are best carried out. Further, such a book should contain a clear and readable section on the theory and use of indicators. In these essentials Mr. Starck's book is not wanting. The book is noteworthy too in containing descriptions of a large number of analyses of pharmaceutical products for the benefit of students of pharmacy. But in congratulating the author on the soundness of his text, we would put in a gentle protest against some of his expressions. To "factorise" a solution (p. 30), meaning to determine its exact strength, may be pithy but it is not good English, and is there not loose thinking in the phrase "if the standard acid . . . has a factor" (p. 61)? By request the book contains an inset of good qualitative analysis tables.

Essentials of Histology

Thirteenth edition. By Sir E. SHARPEY-SCHAFER, F.R.S. Edited by H. M. CARLETON, M.A., B.Sc., D.Phil., Lecturer on Histology in the University of Oxford; Research Fellow of New College, Oxford. London: Longmans, Green and Co. 1934. Pp. 618. 15*s.*

THE first twelve editions of Schafer's Essentials of Histology have covered a period of close on fifty years, and for the great part of that time the work has been the standard text-book on the subject for medical students in this country. All these editions have been brought out under the editorship of the original author; the thirteenth, which now appears, has been edited by Dr. H. M. Carleton. The general form of the book has been maintained and most of the alterations are minor ones. The section on hæmopoiesis has been rewritten so as to include an account of the theory of Sabin on the development of blood-cells. The section on bone-formation has also been rearranged and set out in a simplified manner. A certain number of the older illustrations, such as those figuring obsolete microscopes, have been discarded, and several new microphotographs have been introduced. A new coloured drawing illustrating the structure of the anterior lobe of the pituitary gland might well be used to support the argument that good drawings are superior to microphotographs for teaching purposes. It is to be hoped that in future editions many more such drawings will be introduced, and that some of the microphotographs which still figure in the present edition will be replaced.

Practical Physiology of the Sense Organs

By R. J. Lythgoe, M.A., M.D., D.Sc., Reader in the Physiology of the Sense Organs in the University of London. London: Humphrey Milford, Oxford University Press. 1934. Pp. 30. *1s.*

The series of exercises described in this little book is extremely valuable. The experiments are designed as an introduction to the study of the special senses, and naturally more space is devoted to vision than to anything else. The student following this course becomes acquainted with the effect of drugs on the eye, the action of lenses, and the use of instruments. In addition, numerous experiments are made which demonstrate the underlying principles and illustrate the theories of visual perception. The most striking feature is the simplicity of the apparatus required; most of the exercises could be performed in the worst equipped of laboratories. This simplicity is no doubt due in part to the fact that the course has been tried out over a number of years and proved to be a practical proposition; chiefly, however, it is to be attributed to the insight which the author has into his subject and his skilful choice of easy but significant observations.

The Medico-Legal Necropsy

A Symposium held at the Twelfth Annual Convention of the American Society of Clinical Pathologists, June, 1933. Edited by Thomas B. Magath. London: Ballière, Tindall and Cox. 1934. Pp. 167. *11s. 6d.*

This collection of addresses delivered by seven leading American pathologists contains interesting material. Oscar T. Schultz discusses the medico-legal system of the United States of America, and lays particular stress upon the reasons why the coroner system should be abolished and its place taken by a State "medical examiner system." It is his view that "the obscure and political character of this office and the lack of clarity in the statutes defining its duties and authority combine to make the coroner's office an unsatisfactory agency in the administration of justice." Charles Norris, the chief medical examiner of New York City, deals with the general principles of holding medico-legal post-mortems and he reiterates a suggestion which he made several years ago, that in small counties a hospital pathologist and the health officer might assume the rôle of medico-legal experts. He recognises the difficulties of getting such a scheme adopted in his country where, he says, "the coroner's physicians are appointed largely through political influence." British authorities will be divided in the wisdom of the suggestions here made, but most will agree with his contention that "the primary qualification is that he (the person performing the post-mortem examination) must be thoroughly versed in the practical side of pathology; hence a long and varied autopsy experience." A. V. St. George describes the American method of performing post-mortem examinations, and the book contains also a discourse on the pathological anatomy of death by drowning, and a report by Harrison S. Martland, professor of forensic medicine in New York University, on the post-mortem appearances in deaths from shooting, stabbing, cutting, and asphyxia. The latter contains an account, with photographs, of certain findings which are said to be characteristic of gangsters who have been "taken for a ride" and "put on the spot."

The Identification of Firearms and Forensic Ballistics

By Major Gerald Burrard, D.S.O., R.F.A. (ret.). London: Herbert Jenkins Ltd. 1934. Pp. 220. *12s. 6d.*

Major Gerald Burrard, from his wide experience as expert witness in cases where medico-legal problems have been associated with firearm injuries, has become impressed with the prevalent ignorance of the elements of the construction and working of firearms. He has therefore set himself to explain clearly and concisely the fundamental principles of firearms and projectiles in so far as they are related to forensic problems. He describes first the various types of firearms and cartridges, the principles of ignition, combustion, and pressure, and the factors involved in ascertaining the range of a shot; and then deals with the methods of identification of firearms by microscopy of the fired bullets and cartridge case, supplying some excellent photographs and photomicrographs. Extracts from the evidence tendered in court in cases where the author was an expert witness serve to show the vital importance, in cases of this kind, that the medical witness should have a sound knowledge of the weapons involved and of the different lesions likely to be produced by them. "Expert" witnesses should also be skilled in the microscopical identification of the lesions. The essentials of forensic ballistics are here set out in a readable way and the book will fulfil a useful purpose if it helps to prevent avoidable misunderstandings in court and to establish common ground among those concerned in the investigation of injury or death due to firearms.

The Lyophilic Golloids

Their Theory and Practice. By Martin H. Fischer, Professor of Physiology in the University of Cincinnati; and Marian O. Hooker, Research Associate in Physiology in the University of Cincinnati. London: Baillière, Tindall and Cox. Pp. 246. *22s. 6d.*

Prof. Fischer's work on physical chemistry, particularly in relation to œdema, is so well known as to commend any publication of his to a wide circle. The present volume deals with researches carried out in his laboratory during the last 15 years and is divided into three parts. The first section is concerned with the general principles and behaviour of lyophilic colloids, a detailed study being given of a series of well-known systems—e.g., phenol/water, quinolin/water, and certain soap/ and gelatin/water systems. The second deals very briefly with the chemical application of these systems. The final section is concerned with the biological application of the two preceding sections and is the most interesting to the medical and physiological reader. No one who wants to understand the mechanism of œdema can afford to leave it unread.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 15, 1934

A NEW VIEW OF PSORIASIS

A NOTABLE contribution towards the solution of the problem of psoriasis, perhaps the greatest and most elusive in the domain of dermatology, appears to have been made by Prof. O. GRÜTZ, of Wuppertal-Elberfeld, in a lecture given to the Berliner medizinische Gesellschaft on June 6th last and published in the *Deutsche medizinische Wochenschrift*, July 13th, 1934, p. 1039. His hypothesis is based on the histological findings in a case of the disease in which diabetes, with hyperlipoidosis and hypercholesterinæmia were superadded. It was shown by special fat-staining methods that the lipoid substances which had been excreted into the skin, with the production of characteristic xanthoma nodules, were present in great abundance in the parakeratotic scales which are the clinical sign manual of psoriasis. This was no new discovery, for excess of cholesterin and lipoid substances had long since been recorded in psoriasis scales by UNNA, LINSER, and others. Its significance had, however, been ignored. GRÜTZ reinvestigated the point, went a step further, and in collaboration with a biochemical colleague Prof. BÜRGER, of Bonn, has now examined the lipoidal content of the blood of a large number of psoriatics. This had previously been done by PULEY and BRILL, but they appear to have contented themselves with only one or two examinations of each case and to have found no abnormality. A physician suspecting hyperglycæmia would hardly be satisfied with a single negative blood examination; the GRÜTZ-BÜRGER series of blood examinations appear to have been conducted on the lines of those which are now in use in the diagnosis and management of cases of diabetes before a routine has been definitely established.

In brief outline the procedure consists in giving 5 g. of cholesterin in 100 g. olive oil to the fasting subject, and then withdrawing 50 c.cm. of blood at 4, 8, and 24-hourly intervals for examination of the variations in the fat and lipoid of the untreated serum.[1] The alteration in psoriatics as compared with the normal is said to have averaged a 40 per cent. increase of total serum-fat content, together with a pronounced excess of cholesterin and phosphatide compounds. This figure is high enough to render recognition of the characteristic blood state a relatively simple matter, and should make correspondingly easy the task of the pathologists who will be investigating the justification of the claims put forward. If the results confirm BÜRGER's work we shall have to regard psoriasis as due to a disturbance in the metabolism of fats, and the pathogenesis of the disease will afford a close resemblance to that which now pertains for xanthoma. Right or wrong the hypothesis presents us with a key which appears to fit many of the subsidiary locks in the prison which has guarded the secret of psoriasis. On the side of its undoubted hereditary tendency it may be urged that just as diabetes—a carbohydrate dyscrasia—may be familial, so we may have a congenital inability to deal with the metabolism of fats. The effect of arsenic in psoriasis may be due to its influence on general metabolism, including that of fats—the excessive formation of which is sometimes stimulated by arsenical medication. No one would deny this possibility, for thyroid and other endocrine products have been generally accepted as having a favourable influence on the course of the disease in many instances. The benefit of local treatment with tar, chrysarobin, cignolin, and a host of other substances can similarly be explained as a local chemical effect—possibly of oxidation type—on the lipoidal and other fatty substances present in the lesions, while the recurrences after local treatment on this basis require no explanation at all. Nor would it be surprising that the effect of sunlight, ultraviolet light, X rays, and other physical methods should only be temporary.

The scheme of treatment suggested by Prof. GRÜTZ is presented in a very simple table. Fats, oils, cream, butter, cheese, and margarine are banned, and it should be the doctor's aim to reduce fat intake, which cannot be altogether excluded, to a maximum of 20 g. in the adult and 10 g. in children per day. Yolk of egg, in view of its cholesterin content, should also be excluded, although the white is allowed. Such a diet should offer little difficulty even in domestic circles, and calorie requirements are amply covered by carbohydrate and protein intake. There appears to be little danger of serious loss of weight even after months of fat deprivation, and no mention is made of nutritional effects due to the loss of vitamin D. It is quite likely that just as in most cases of hyperglycæmia there is an individual threshold, it would be possible to ascertain the fat and cholesterin tolerance by trial and experiment for each patient suffering from psoriasis, so that he would not necessarily have to endure a completely fat-free diet for the rest of his life. It is evident, so far as the work has gone, that dietary treatment does not and is not expected to cure psoriasis. But if it renders latent the inherent dyscrasia in the metabolism of fats, a patient conforming to the principles laid down by his doctor might reasonably expect to remain immune from attack. The periods of remission, followed by recurrences, which have hitherto been the disheartening fate of victims of this disease will make it impossible to assess the value of this new form of treatment for some years; the case records of Prof. GRÜTZ series are not given in his lecture, but are promised for early publication.

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[1] Grütz, O., and Bürger, M.: Die Psoriasis als Stoffwechselproblem, Klin. Woch., 1933, xii., 373.

THE TEMPERATURE OF THE BODY

NOT long ago, in connexion with artificial pyrexia, we discussed briefly the principles underlying the maintenance and control of the body temperature.[1] Dr. C. E. LAKIN, in the Lettsomian lectures concluded on p. 586, reviews the subject in greater detail, and in considering the diverse lesions that may give rise to pyrexia indicates several gaps in our knowledge, especially of the part played by the ductless glands. ALBERT SALMON, of Florence, goes further and gives a comprehensive account [2] of his reasons for believing in the paramount importance of the inter-relations of the endocrine organs and autonomic nervous system, while W. CRAMER, in his well-known *monograph on fever and heat regulation*, lays the emphasis on the thyroid-adrenal apparatus, dismissing as a crudely vitalistic conception "the idea of a heat centre or of several centres, which are supposed to function like a thermostat and which in fever are supposed to be 'set' at a higher temperature." Dr. LAKIN gives due weight to differences of opinion on this point; and indeed it is important to retain a clear perception of the issues involved and to bear in mind that the subversive nature of such statements is more apparent than real.

By balancing heat loss against heat production the body is able to correct a rise or fall in temperature before it has gone too far, and this is unquestionably the principle of the thermostat. The real problem is the location and identification of the sensitive element; is this a restricted area in the brain, the sympathetic nervous system as a whole, or one or more of the ductless glands? It must be such that it is able to influence remote structures, for the reaction of the cells themselves is, when heated, to produce more heat, and when cooled to produce less: a vicious type of response which is the negation of temperature control. Some coördinating entity, which is able to balance off the activity of one set of tissues by varying that of another, is a logical necessity. Heat loss, depending on the sweat glands, the arrectores pilorum, and the calibre of the cutaneous blood-vessels, is almost entirely under the influence of the sympathetic and therefore of the thyroid and suprarenal medulla. Heat production, in so far as it depends on the metabolic rate, is subject to the same influences. But there is another aspect of the question. Most of the heat production in the body goes on in the muscles, and these are under voluntary and somatic reflex control; the more active they are, or the higher their degree of tonus, the more heat they produce. To a large extent, therefore, heat production is determined by external conditions, such as the temperature and humidity of the air, affecting tonus, and the expediency or otherwise of exercise. It is not denied that the sympathetic-endocrine factors *may operate somewhere in the chain*, but the starting-point is the state of the muscles. With these facts before us, we may be justified in postulating two convergent systems. The first, controlled by the sympathetic and ductless glands, arranges for a standard rate of metabolism, balanced by an equivalent rate of heat loss; the second gives rise to adventitious increases and decreases in heat production, and depends chiefly on the activity of the voluntary musculature. There is no similar duplication of the methods for heat loss, so that the one group of mechanisms must respond to a change, or threatened change, of temperature however produced. Theoretically the basic sympathetic-endocrine system could arrange for any standard rate of energy production on the part of the cells of the body, these being able to modify it by their degree of functional activity, and so long as heat loss was adequate the temperature would remain constant. There would be three courses open to the body when confronted, say, by a fall in external temperature. It might diminish its heat loss, it might increase by sympathetic activity or the outpouring of thyroid or suprarenal secretions the metabolic rate of all its cells, or it might increase the functional activity of voluntary muscle, which is sufficiently widely distributed through the body to lead to a fairly uniform increase in heat production. There seems no reason at present to give pre-eminence to any of these three methods, and probably all are operative.

In pathological disturbances of any of these three mechanisms, compensation could be brought about by adjustment of the other two, as in hyperthyroidism, and a normal temperature could thus be maintained. Where an abnormal temperature does occur, there must still be compensation once the temperature level is established; only the initial rise or fall is attributable to excess of production over loss or vice versa. Any permanent imbalance must result in a progressive and rapidly fatal rise or fall of temperature. We must therefore grant some importance to the conception of the "setting" of the thermostat, which though it does not explain, allows us to visualise the state of affairs in pyrexia or hypothermia. These conditions cannot be *explained merely in terms* of the amount of heat being dealt with by the body. The fact that they are so often associated with lesions of the suprarenal, thyroid, pituitary, and hypothalamus, points to these structures being intimately concerned with the thermostatic control *as well as with the manufacture and dissipation* of heat. The most plausible focus of this system is a group of cells in the tuber cinereum, which, through the autonomic nervous system, could control the other members. The evidence for this is admirably reviewed by Dr. LAKIN and Dr. SALMON *in the papers* to which we have referred.

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[1] THE LANCET, 1934, i., 1075 and 1129.

[2] Presse méd., August 15th, 1934, p. 1292.

PUBLIC HEALTH AND POOR-LAW

More than sixty pages of the latest annual report of the Ministry of Health[1] are given up to a discussion of the results of the special surveys carried out by the officers of the Ministry since the passage of the Local Government Act, 1929. To what extent have county and county borough councils availed themselves of the power, which they have a large measure of freedom to use or to neglect, of coördinating their old and new public health and medical functions in one economical and efficient organisation for the public welfare? It was foreseen by those who had studied the Local Government Act with a background of knowledge of the poor-law system, that the removal of the more important medical services from its ambit by the method of "declarations" could have little immediate application, and the surveys confirm the prediction; but the reluctance of authorities to transfer institutions by the less drastic means of "appropriation" will disappoint progressive members of the public, as it has already disheartened some public health administrators. So far only 27 county borough councils and one county council outside London have appropriated one or more poor-law infirmaries in their area to be administered under the Public Health Acts. There are real difficulties. Many poor-law institutions are so constructed that it is difficult to dissect away their sick beds from the other manifold purposes of a non-medical character which they serve. Only 34 separately existing hospitals outside London were transferred to the councils at the passage of the Act, nine of which were in counties. Planning, therefore, and some rearrangement of the use of institutions and, above all, a progressive outlook were required. The report states that authorities rarely offered any reason for their inability to utilise the power of appropriation, but the Ministry have evidently a shrewd idea as to the main causes of this reluctance. These are the well-worn financial obstacles to appropriation. It has often been stated that the power of recovering costs from relatives under Section 16 of the Local Government Act is less wide in its application than that afforded by the poor-law, and that no power to charge costs to places of settlement is afforded outside of the poor-law. The validity of the former contention is questioned in the report and means are suggested of overcoming the second difficulty, but the essential point is emphasised that authorities who have taken the step have had no trouble in practice. It might have been added that an inspection of the accounts of the former boards of guardians would reveal that, in fact, negligible proportions of the sums of money which they collected were obtained on the strength of their special powers, and that the use of hospitals by non-residents is only significant in volume in relation to the inhabitants of adjoining districts, with whose authorities agreements can readily be made.

The real difficulty, as everyone knows who has watched the inside workings of local government, is the unwillingness of public assistance committees and their officers to yield up any of their functions. "It appears to the Minister unfortunate," the review mildly remarks, "if this issue is treated as one of domestic administration for a particular committee rather than as one of general council policy, and the Minister thinks that in some cases at any rate the question of appropriation requires to be considered from a somewhat broader point of view than hitherto." Besides appropriation of institutions, the other obvious and expeditious way of bringing about coördination of the transferred poor-law services with other public health activities is through the personal link of the medical officer of health. Indeed, so far as domiciliary medical assistance is concerned there is no other means unless "assignation" to the public health committee of the administration of this purely poor-law function of the public assistance committee is made, a procedure which the Ministry do not appear to consider worthy of mention. The review reminds us—and the survey reports made it clear to individual authorities—that, under the Public Assistance Order, 1930, the medical officer of health is the adviser of the public assistance committee in all medical and public health matters. It is a matter of common knowledge, and one causing the Ministry the greatest dissatisfaction, that medical officers of health in many areas have been quietly but firmly excluded from any part in poor-law administration. Although the Ministry do not mention it, it may properly be said here that in some, at least, of these areas the medical officer of health is partly to blame for lack of firmness and initiative in tackling the situation. The review does, however, draw attention to the vastly increased importance and responsibilities of the position of the medical officer of health, and discusses the qualities desirable in its holder, as well as the way in which his time and energies should be spent. Perhaps in some future report the Ministry will suggest means whereby the methods of selecting officers for this key position may be improved.

Even before the passage of the Local Government Act much of the clinical work of local authorities was carried out by coöperation with voluntary hospitals; of 26,773 beds approved for tuberculosis at Dec. 31st, 1933, 8140 were in voluntary institutions, and at the same time 112 voluntary associations provided 1928 maternity beds utilised by local authorities. The need for close and continuous coöperation between statutory and voluntary bodies has, however, been immeasurably increased by the acquisition of poor-law beds by the former. "It is," the review says, "one of the most definite impressions derived from the surveys that coöperation is essential and that its absence leads to inefficiency and wastage of resources." Here again the achievement falls far short of the desirable, and the main causes appear to be jealousy, suspicion, and fear of encroachment. Perhaps the recent success of the negotiations in London will act as a stimulus to those in the provinces who still hesitate. The status and relation of medical schools to both types of hospital managers is a matter to which the review does not refer but which requires early consideration. This report on the official surveys is a uniquely frank official document which ought to be read by everyone interested in the services and in hospital problems.

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[1] Fifteenth Annual Report, 1933-34. Cmd. 4661, 1934. H.M. Stationery Office. 6s.

ANNOTATIONS

CINCOPHEN POISONING

"'This is the first known death from this particular drug after over half a million cachets have been sold,' said the Liverpool coroner (Dr. G. Cecil Mort). . . . The coroner explained that in recent years there was a group of drugs which had become popular under various trade names, but actually contained acid composed of constituents of quinine and carbolic acid. One group was called acidum phenylcinchoninicum, which had in some cases acted like a charm in chronic rheumatic disease. 'No doubt Crosby had an idiosyncrasy,' he added. . . . Dr. Frank William Crossley-Holland, of Dunstable, Beds., on behalf of the proprietors of the drug, said that it had been on the market five years, and that there was no record of any ill-effects. . . . The coroner added that a doctor friend of his took one grain of quinine. 'He was almost at death's door,' he continued. 'It was purely an idiosyncrasy.'" (From the report of an inquest in the *Manchester Guardian*, Sept. 4th, 1934.)

If that is a correct report of the remarks of the Liverpool coroner and of the medical witness, it calls for a reminder of the known toxicity of the drug in question. "Acidum phenylcinchoninicum" was the name given in the United States Pharmacopœia IX. to the substance which appears in the British Pharmacopœia and elsewhere as cincophen or quinophan, and which is widely sold as Atophan, Phenoquin, Agotan, &c. Chemically it is phenyl-quinoline-carboxylic acid, and has some affinity with salicylic acid (hydroxy-phenyl-carboxylic acid). It was introduced as a therapeutic agent in 1908 by Nicolaier and Dohrn, who suggested its use in gout because they found that it increased the excretion of uric acid. Since then it has been recommended not only in gout, but also for its analgesic properties in many chronic joint conditions and even in sciatica, for its antipyretic properties in acute rheumatism, for its antiseptic action in urinary infections, and on various grounds in other conditions as well. It sometimes produces minor toxic effects such as urticaria and other skin rashes, giddiness, headache, loss of appetite, nausea, vomiting, and albuminuria. These were early recognised, but it was not until 1923, 15 years after its introduction, that it was first accused—by C. C. Worster-Drought—of causing a toxic jaundice. Since then the published case reports of jaundice following its use have steadily multiplied, and there seems no doubt that the drug is responsible. Two years ago T. G. Reah [1] described in our columns 3 cases from the London Hospital and 32 collected from the literature; last year K. Larsen [2] tabulated 97 reported cases, and early this year the *Journal of the American Medical Association* [3] referred to 107. The mortality in these published cases is between 40 per cent. and 50 per cent., and where post-mortem examinations have been made the regular finding has been either hepatitis or subacute or acute atrophy of the liver. Those facts are in themselves sufficient comment on the statements made at the Liverpool inquest, and on the resulting headline "First Known Death from Drug: 500,000 Cachets Sold." It may be that no previous death had been attributed to the cachets prepared by this particular manufacturer, but the same cannot be said of the drug cincophen, which the cachets apparently contained.

The incident raises the wider question of the proper place of cincophen in medicine. Its extensive use over 25 years may be taken as presumptive evidence that it has an appreciable therapeutic effect. It produces, en masse, a therapeutic benefit—but at a cost; for it is known that about 50 persons have died of cincophen jaundice and there must be many other fatal cases unreported. In the last issue medical opinion must judge whether the benefit is worth the price. But before the issue is judged two inquiries must be made. First, is there any means whereby the giving of the drug may be made quite safe? Cincophen cannot be rendered safe by restricting its dose, for (see Carroll and Elliott [4]) jaundice has been reported after doses of widely varying magnitude and duration, even after so little as grs. 90 in a few days. Suspension of the drug on the first occurrence of warning symptoms (itching, skin eruptions, gastro-intestinal disturbance) might have saved some cases from jaundice, but in others there was no warning; small initial trial doses are of no help, for some patients have taken the drug for months before jaundice appeared. Once the liver has been damaged no known treatment can be relied on to save the patient's life. The second inquiry is: can any less dangerous treatment produce the same measure of benefit as the drug in question?. In the case of cincophen this is very pertinent. Its transient effect on uric acid excretion is well established, but whether it favourably influences the metabolic deviation underlying gout is open to question. As the *J.A.M.A.* once remarked,[5] "its striking effect on the elimination of uric acid captured the clinical imagination, which was at that time perhaps somewhat overconscious of uric acid." Sollmann is inclined to think that cincophen relieves pain and reduces fever in just the same way as salicylates do, and doubts the existence of any specific therapeutic effect beyond that. Less conservative opinion offers neocincophen (ethyl-methyl-phenyl-quinoline-carboxylic acid) as a safe substitute, and it appears that well attested cases of neocincophen jaundice are almost unknown (J. S. Davis[6]). In general, therefore, cincophen does not seem to have a peculiar therapeutic value that is as great or as certain as, for example, that of neosalvarsan in syphilis or that of quinine in malaria.

That being so, the onus is on the user of cincophen to prove, in the first place, that it is a more potent or more specific agent than salicylic acid and its harmless derivatives, and further that its virtues are so great as to be worth the death of a small but significant number of patients whose livers it damages beyond repair. Until that proof is forthcoming the drug should not be in general use, and its fatalities should not be condoned by pronouncing that blessed word idiosyncrasy.

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[1] THE LANCET, 1932, ii., 504.
[2] Ugeskr. f. Laeger, 1933, xcv., 189.
[3] Jour. Amer. Med. Assoc., 1934, cii., 59.
[4] Med. Clin. North Amer., 1933, xvii., 473.
[5] Jour. Amer. Med. Assoc., 1930, xcv., 345.
[6] Amer. Jour. Med. Sci., 1932, clxxxiv., 555.

A NEW CANCER GERM

DURING the last three years Dr. W. von Brehmer has maintained the thesis that cancer is due to a micro-organism and is always associated with a shift of the hydrogen-ion concentration of the blood towards the alkaline side, the critical value lying between 7·5 and 7·6. In a recent paper [1] he describes in detail the isolation and culture of the "Syphonospora polymorpha," and what he believes to be its relation to the genesis of cancer. This paper is followed by one from Prof. Victor Schilling, director of a university clinic in Berlin, who has repeated Brehmer's experiments, and by a brief communication from two bacteriologists, Dr. C. Börner and Dr. O. Janke.

The organism has been obtained from the blood of cancer patients and of animals bearing a malignant growth, and also from human and animal tumours. In the blood it is attached mainly to the outside of the red blood corpuscles, and it can be demonstrated in blood films by a Giemsa stain. By a "special subcutaneous injection," the nature of which is not revealed, this organism can be detached from the red blood corpuscles and appears then in large numbers free in the serum. The organism is a very pleomorphic aerobe and is stated to have an invisible phase in which it passes a membrane filter, to appear again, under suitable conditions, in the filtrate in a visible form. The life-history of the organism begins with a single spore, of a size varying between 0·1 and 0·6 μ. The spore may divide so that two or four spores come to be enclosed in the same membrane, or there may even be a division into numerous spores lying in a greatly distended membrane with a diameter of 5 μ or more, which eventually bursts and liberates the spores. The single and double spores have been found in the blood of apparently normal healthy persons, as well as in that of cancer patients. These forms are considered to be non-pathogenic, at least so far as cancer is concerned. They can exist at a pH varying from 6·5 to 7·2. Under suitable conditions, of which the most important is a pH of 7·4 to 7·6, the spores extend in one direction, so as to form tubules 0·5 to 2·8 μ long, and 0·2 to 0·8 μ broad, filled with spores. These are the pathogenic forms. The spores, when liberated into the blood, enter damaged cells. In the cytoplasm they again develop into the pathogenic forms which penetrate the nucleus and produce the malignant change. No histological evidence for these contentions is submitted. The crucial experiment, viz., the production of malignant new growths by the injection of pure cultures of the pathogenic forms, is stated to have given positive results, but no detailed evidence is given. In repeating these observations with Brehmer's assistance, Schilling succeeded in obtaining pure cultures of the tubular forms of the micro-organism from human and animal malignant tissue and from the blood of cancer patients and of tumour-bearing animals. He had, however, difficulty in convincing himself of the existence of these forms when the blood of cancer patients was examined directly. Moreover, his own experiments to demonstrate the production of malignant new growths by the injection of pure cultures have so far been negative. He leaves it, therefore, undecided whether the occurrence of this organism has any causal relationship to cancer.

It is difficult to reconcile Brehmer's conceptions with the known facts concerning cancer. The existence of an alkalosis in cancer is by no means an established fact; it has been denied by several competent observers using exact and direct methods with the necessary precautions. The clinical observation that it is possible to cure a patient (or an animal) completely by the removal of a malignant growth at its early stage, Lacassagne's work on the experimental production of mammary cancer in mice,[2] the impossibility of transmitting mammalian cancer except by the intervention of living cells, are only a few of the facts which do not fit in with the idea of a visible causative organism circulating in the blood and becoming pathogenic in an alkalotic condition of the blood. Brehmer's statements appear to have met with criticism in Germany. Until confirmatory evidence is available, claims of a successful treatment based on such a conception must be regarded with reserve.

PSYCHOLOGY AND SOCIAL PROBLEMS

THE recognition of the importance of psychology in sociology and in medicine has been a slow process. The reason for this is not difficult to understand: much of the traditional psychology is lacking in the precision and objectivity which science demands. Nevertheless, the operation of innate human tendencies in social life cannot be ignored. The problems of society, as Mr. Shepherd Dawson, D.Sc., points out in his presidential address to the psychology section of the British Association, are partly material and partly mental. The new methods by which the science of psychology is advancing are scarcely more acceptable to the medical mind than were the old philosophical hypotheses. The objective approach is now achieved by statistical inquiry; the work is laborious and the results are not spectacular. From the social point of view, the object of such investigations is to discover what is the innate capacity of groups of individuals and to ascertain what social environment is most suitable for them. Society must also be moulded to fit the desires and impulses of the individual. The inborn capacity expresses itself in various abilities which can be measured by mental tests; in course of time, it should be possible also to measure with accuracy temperament and special aptitude. The antithesis between the effects of heredity and environment is of great significance in social and psychological investigations. Numerous methods are available for examining the effects of environmental alterations upon mental ability; Dr. Dawson quotes an interesting example. In Glasgow some children were tested at the time of their removal from slum houses to a rehousing area, and again about 18 months later. At the second test they showed a just appreciable improvement, whereas a control group that did not move from their slums showed no such improvement. Dr. Dawson takes a hopeful view about the effects of attempts to improve mental ability by modifications in mode of life and education of individuals. He condemns the type of inquiry which purports to investigate problems of mental defect by throwing together mental disease, criminality, pauperism, and infantile mortality: such inquiries only investigate social inefficiency. Our knowledge of the mode of inheritance of mental characters is not yet precise enough to warrant the belief that social failure is due to heredity. The most promising method of attack, upon the social problems associated with mental defect, is so to adapt our social and educational environment that suitable occupations can be found for the large group of individuals who are unable to take full advantage of scholastic opportunities.

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[1] Med. Welt, August 25th, 1934, p. 1179.

[2] See THE LANCET, 1934, i., 1013.

FOOD AND PHYSICAL FATIGUE

THOUGH everyone knows that the energy needed for work is derived from food, little has been done to ascertain whether the food converted into energy has been consumed recently or has first been stored in the body. Muscular work is supported by glycogen, much of which is carried by the blood from the storehouse of the liver; but carbohydrate food may also reach the blood direct from the stomach without being previously placed in store. Athletes engaged on long-sustained efforts have always recognised the value of taking during exercise some form of sugar, chocolate and dates being favourites. The practice is a sound one, although it has only recently received attention in scientific dietaries, and it has now been applied to industrial output which normally falls off in the last hour or so of the day. On the theory that this fall might in part at least be due to depletion of the glycogen in the blood, an experiment was conducted [1] in which a hot milk drink rich in maltose was consumed in the middle of the afternoon by girls occupied on light repetitive work. (Malt sugar is one of the first foods to leave the stomach and be converted into glycogen ready for the use of the muscles.) As a result of this extra nourishment output increased during the remainder of the shift by from 5·3 to 6·1 per cent.; the increase was greater where the process involved more muscular activity, and the work curve lost the shape indicative of fatigue. Probably for heavier work the improvement would have been even greater. This experiment suggests that advantage might be gained from careful consideration of the kind of food taken by operatives, both at home and (more particularly) at the works' canteen, and also of the time, in relation to work spells, at which it is taken.

POLIOMYELITIS VACCINE

IT was announced recently in the newspapers, both in this country and in America, that Dr. M. Brodie, working in the laboratories of the Department of Health of New York City, had produced a vaccine for prophylactic immunisation against poliomyelitis. So far as we are aware no description of this work has yet been published in any of the scientific journals, and the only details available are those given in the accounts that have appeared in the lay press and in a leading article published in the *Journal of the American Medical Association* (July 28th). The latter, being based on information furnished by Dr. W. H. Park, director of the New York City Laboratories, may be taken as representing the true state of affairs.

In the past many attempts have been made to devise a vaccine effective against poliomyelitis, but without any great success. As a matter of fact the same could be said of most virus diseases, for it is only during the last ten years that any material advance has been made in the immunisation of man against the virus infections to which he is susceptible. (Outstanding exceptions to this generalisation are, of course, prophylactic immunisation against smallpox and rabies.) The difficulty has been the preparation of a vaccine which would produce immunity and yet carry no risk, and the first real progress in this direction came from the use of formalin in the preparation of virus vaccines. About ten years ago this method was applied to the virus of foot-and-mouth disease, when it was shown that virus inactivated by low concentrations of formalin retained in large measures [illegible] and subsequent work with other vir[illegible] and yellow fever proved its general applicability. It must be remembered, however, that these formolised vaccines have never been found to confer a really good immunity, and in distemper prophylaxis the immunity produced by the inoculation of the vaccine is reinforced by a second inoculation of living virus. Without in any way wishing to detract from the value of Brodie's work, it may be pointed out that the preparation of his vaccine involves no new principle. It is a formolised vaccine and may have the same limitations as other formolised vaccines. This does not necessarily follow, of course; and further developments in his investigation will be awaited with great interest.

It has also been stated in the press that supplies of a "new English vaccine against infantile paralysis" have been sent to Denmark for use in a serious outbreak of poliomyelitis in which 700 cases are reported. This is not quite correct, for the "vaccine" is really a serum. It is prepared in the horse [1] and is intended for prophylactic use, and a considerable quantity has in fact been sent by the Lister Institute, Elstree, to the State Serum Institute at Copenhagen. It may be obtained, we understand, through Messrs. Allen and Hanburys Ltd.

AMBULANCES AND BOUNDARIES

THE ambulance authorities of the Croydon Corporation and the London County Council are to be congratulated on the common-sense arrangement by which patients are no longer to be trans-shipped on reaching the boundary between the two jurisdictions at Norbury Brook. Croydon patients injured within the L.C.C. area will be fetched home to Croydon by a Croydon ambulance without any shunting, and vice versa. It is stated that Croydon hopes soon to negotiate similar treaties with Purley, Caterham, Beckenham, Penge, and Mitcham. Eighteen months ago Mr. Doran, M.P., put a question to the Minister of Health as to this undesirable trans-shipment of sick and injured patients on the boundaries of local government areas and as to the possibility of legislation to enforce facilities for through services. The Ministerial reply [2] was more polite than definite. The matter remains one for local arrangement. No such hesitation to cross an English rubicon is shown by the voluntary workers of the Home Service Ambulance Committee operating under the joint authority of the British Red Cross Society and the Order of St. John of Jerusalem. But voluntary bodies are free from some of the legal restrictions which beset a local authority; their difficulty is not so much the fear of what a district auditor may say as the financial limitations inherent in their charitable work. Colonel Crookshank, M.P., endeavoured last June to incorporate in the latest Road Traffic Act a clause enabling a voluntary association for ambulance service to claim a fee of ten shillings for any patient transported for emergency treatment. His proposed amendment was rather heavily defeated. Comment was made last year [3] upon another aspect of the too rigid insistence on local government boundaries. A motorist had been fatally injured on the Kingston by-pass road and the Surbiton ambulance was summoned, but its driver took his vehicle home empty on finding that the injured man lay 70 yards outside the Surbiton area. It is not clear whether

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[1] Laird, D. A.: How a Warm Milk Drink in the Middle of the Afternoon's Work Reduces "Last Hour Slump," Med. Record, August 1st, 1934, p. 131.

[1] Particulars of the preparation and use of the serum will be found in Recent Advances in Vaccine and Serum Therapy, by Prof. A. Fleming and Dr. G. F. Petrie, London, 1934 (p. 190).

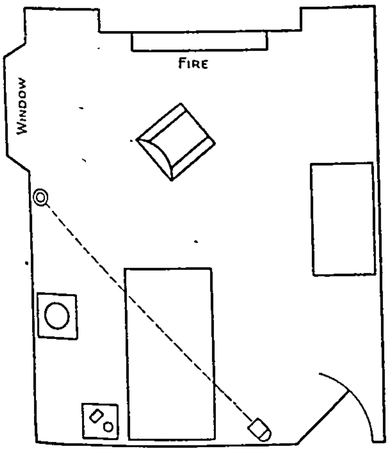
[2] See THE LANCET, 1933, i., 149.

[3] Ibid., 1933, ii., 41.

Croydon's agreement with the L.C.C. will cover such cases as these. The public is apt to be impatient of these incidents, which recall the ancient squabbles between parishes or unions over the liability for paupers. Another not dissimilar difficulty has lately received attention. A child contracts scarlet fever and the local authority is asked to remove the patient to its isolation hospital. If the child turns out to be a mere visitor to the neighbourhood and to be really resident in some other authority's area, treatment has been refused. It was high time that the Ministry of Health took action to correct this anomaly, which was due to a vestigial survival of the old poor-law embedded in our public health legislation, and since July 1st every sanitary authority has the same obligation to deal with infectious disease whether the patient is a resident or a visitor. The recent reorganisation of English local government into fewer and larger areas is still imperfect unless the authorities make full use of their powers of reciprocal arrangement.

PHOTO-ELECTRIC TELL-TALES

THE use of a beam of light to operate a signalling device by means of a photo-electric or selenium cell is now some years old. In industry and traffic control, to name only two departments, it has been put to countless ingenious uses. In its essentials it consists of a "bridge" or light-sensitive switch, which allows a current to pass it when it is illuminated by a ray of light or, conversely, when a constant beam directed upon it is interrupted. If a ray of light is directed at the "bridge" a little above the track of a conveyor in a factory, each package that crosses the ray will record its passing on a counter. In the streets, a vehicle approaching the "bridge" and interrupting the beam, or shining its lights on the "bridge," can be made to work a signalling system. This device is employed in several districts near London, and a number of metropolitan boroughs have arranged for their electric street lighting to be turned off and on automatically when the daylight reaches a certain strength in the morning and when it diminishes at night or during a fog. The same principle is also used for turning lights on and off in factories and offices. A "bridge" placed near the lock of a door or safe can be trusted to sound an alarm when a burglar crosses the beam, or will light up a whole shop when the policeman shines his torch through the spyhole of the shutter. The device can be made to act quantitatively in order to give a precise measurement of the smoke concentration in an atmosphere—a valuable device for saving fuel and preventing pollution. The clinical applications of this invention, which under the name of the Raycraft projector can be obtained from the Radiovisor Parent Ltd., 28, Little Russell-street, London, W.C.1, do not seem to have been adequately appreciated. A hospital might save a considerable proportion of its lighting bill—as well as time and responsibility of staff, by controlling ward and passage lights in this way, and the emergency lighting of the theatre could be turned on without an instant's delay by this means if the primary system failed. For a moderate sum a bedroom can be so fitted up that the sleeper cannot approach door or window without awaking the nurse by an alarm bell; this has obvious value for mental patients and somnambulists. For the biochemist it has an interest in that it will give warning when a liquid reaches any given degree of turbidity



BEDROOM INSTALLATION OF APPARATUS

STANDARDS IN INDUSTRIAL HYGIENE

THE International Labour Office at Geneva has made an effort to define the basic requirements of hygiene in factories and offices, and the result is before us in a pamphlet[1] of 48 pages. A first glance prompts the inquiry whether a code is really necessary to define principles apparently so self-evident and to formulate them in language of such elementary simplicity. But a little reflection will make the reader realise that in both matter and form the work is very much to the point. The code is intended to apply to countries many of which are far behind England in hygienic standards; it is in fact based to a large degree on these standards. Our own practice lags behind ascertained knowledge and even behind the opportunities given by Factory and Public Health Acts. But this is only an additional argument in favour of the wide application of this code, since progress in the industrially advanced countries is bound up with the standards adopted by our competitors in foreign trade. As long as depressed conditions exist abroad our hands are tied from attempting much that is known to be desirable. The question of cost is inescapable. With regard to the language of the code, experience teaches that no language is too simple to convey basic facts. Much of the best work is never adopted in industry because the average manager fails to understand what it is all about. It is a pity therefore that the simple phraseology of the code is marred by Latin tags such as *a fortiori*, *per ascensum*, and *per descensum*. Comprehensive as it is the code is by no means complete. No mention is made of simple but effective means of combating skin conditions arising from irritant dusts or liquids. The effective earthing of electrical gear and the risks of explosion during the cleaning of ventilating ducts used in connexion with volatile solvents of cellulose might have been noted. The kata-thermometer receives but faint praise and the old bogy of chemical vitiation of the air lifts a timid head. These things can be rectified and do not mar an honest attempt to raise hygienic standards among those who do not know or who knowing sin against the light. Even the trite remark that "roofing should be such as to guarantee effective protection for the workers against the heat of sun and the inclemency of the weather" is not superfluous. The fact that our own Home Office welfare pamphlets cover the ground of this code both more fully and in a form more suitable for English readers should not lead us to undervalue any effort at international coöperation. In the industrial field we have many years start and we need to remember that peasant communities turning to industry tend to pass through a phase of hygienic depression similar to that experienced in this country 80 years ago. Anything that can limit this tendency must benefit the whole commonwealth of nations.

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[1] Standard Code of Industrial Hygiene. International Labour Office. Studies and Reports Series F. No. 14. London: P. S. King and Sons, Ltd. 1s. 6*d*.

GLISSONIAN RICKETS

It has for long been a puzzling feature of the original descriptions of rickets that the disease should have been most prevalent in the rural areas, whereas nowadays it has a largely urban incidence. Other features which have given rise to difficulty are the extreme severity of the disease as observed by Glisson in the 17th century, and the epidemic proportions of its first appearance. These difficulties are solved by Dr. C. E. Kellett in a paper[1] describing the social factors which have operated to change Glissonian rickets into the comparatively mild malady with which we are to-day familiar. Dr. Kellett was moved to his task by his experience of two cases of rickets, so severe as to recall Glisson's description of the disease, admitted to Great Ormond-street Hospital. These cases, twin children of a Soho tailor, had been breast-fed for 18 months by their mother whose diet was found to be entirely lacking in vitamins Throughout lactation she had been helping the tailor at his work, so that the children were deprived of fresh air and sunshine. Dr. Kellett draws a striking parallel between the conditions under which the under-paid and ill-fed Soho tailor and his wife live and breed to-day, and the similar conditions which obtained in large areas of rural England at the height of the wool trade in the late 16th and early 17th centuries. The discrepancy between the steadily rising price of wheat and the diminishing wages of labourers reached a maximum in the years between 1620 and 1660, exactly the period in which severe rickets became epidemic. At this time the real value of wages had undergone great depreciation; these scanty wages were earned by preparing and spinning wool, and weaving it into cloth, the whole family working in their cottage throughout the daylight hours. Dr. Kellett gives reasons for thinking that the distribution of the severe rickets described by 17th century writers corresponds with the distribution of the wool industry, and that the diminution in its severity accompanied the decline in England's wool trade following the Thirty Years' War, and the impoverishment of her most important market. The occurrence of severe epidemic rickets was no mere coincidence but the direct result of the economic situation which arose in England in Glisson's time; it may still occur sporadically where a rachitogenic diet is combined with unremitting incarceration.

CEREBRAL BLOOD-FLOW IN EPILEPSY

The state of the cerebral vessels in epilepsy has long been a matter for speculation, illuminated by little direct evidence. Extremely interesting observations have recently been made in Boston, however, which provide important information on this point.[2] If the changes in temperature of a heated stylet, introduced through a hollow needle into a vessel, are recorded, it is found that the temperature of the stylet varies inversely as the blood-flow; the greater the amount of blood passing the instrument in a given time, the more heat is carried away from it, and vice versa. The stylet was devised and tested by Dr. F. A. Gibbs, and he and his co-workers have succeeded in introducing it into the internal jugular vein of several epileptic subjects, some in status epilepticus and some suffering from petit mal. The main result in all cases is quite clear—namely, that all disturbances of cerebral blood-flow occur after the seizure has started, and therefore play no part in its causation. In general the convulsions are accompanied by a rise in blood-flow, but often there is a sharp fall at first. The investigators state that any change in flow is registered immediately by the instrument; so it cannot be said that the decreased flow in these cases occurs actually before the seizure and is not recorded until after it has begun. "Light pressure on the neck over the jugular vein in which the recorder is located produces evidence of a decrease in flow within a fraction of a second. When the contralateral jugular vein is compressed there is evidence, within a fraction of a second, of an increase in flow." The published tracings bear out the claims of their authors, and in addition include respiratory records which suggest an accumulation of carbon dioxide during the attacks. The consequent vasodilatation, coupled with the rise of blood pressure which almost certainly occurs, is probably sufficient to account for the actual changes in blood-flow observed. Artificially produced cerebral anæmia fails to produce convulsions, and the oxygen content of the jugular blood gives no evidence of a chronic stasis of blood having preceded the spontaneous attacks. It is pointed out that only generalised vasoconstriction has been ruled out as a causal factor; a small focus of ischæmia would be unlikely to affect the jugular flow, and cannot be excluded on the basis of these experiments. Other reasons are advanced, however, which tend to discount this possibility.

THE EHRLICH MEDAL

The Paul Ehrlich gold medal was this year awarded to Dr. Walter Kikuth at a special medical meeting held, under the presidency of Prof. W. Kolle, on Sept. 7th, at Frankfort-on-Main. Dr. Kikuth, who is well known in England, has gained his laurels in the realm of chemotherapeutics. Born in Riga, he began his studies at Dorpat and completed them in Germany at the conclusion of the late war. After an assistantship in the Eppendorfer Krankenhaus in Hamburg, he took up tropical medicine in that city and subsequently worked in the Institute Oswaldo Cruz in Rio de Janiero. He then joined the staff at Elberfeld of the I.G. Farbenindustrie and was appointed successor to Dr. Roehl. Subsequently, in 1931, he became attached to the Medical Academy of Düsseldorf University. Dr. Kikuth has published important work on pulmonary carcinoma, and with Prof. Mayer has confirmed Noguchi's work on Oroya fever and verruca peruviana—studies which led him to embrace the whole of the bartonella group. It is however in immunology and chemotherapy as applied to malaria that his main achievements lie, culminating in the working out of the new synthetic drug Atebrin for the treatment of that disease.

It is reported that the Middlesex Hospital has bought from the Berners Estate the freehold of the rectangular island site of nearly three acres fronting on Mortimer-street on which it stands. The hospital holds its site on leases which expire in the year 2753, and pays an annual ground rent of £2750. When it was first built in 1745 it occupied two small houses off the Tottenham Court-road. In 1754 it acquired from Mr. Charles Berners land in what was then known as Marylebone Fields. This land was leased "for 999 years at a rent of 2s. for every foot in front of the said ground."

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[1] Arch. Dis. Childhood, August, 1934, p. 233.

[2] Gibbs, F. A., Lennox, W. G., and Gibbs, E. L.: Arch. Neurol. and Psychiat., August, 1934, p. 257.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XVIII.—PROGNOSIS IN SENILE CATARACT FOLLOWING OPERATION

It is only proposed to deal in this brief article with senile cataract and those of a similar character.

It may fairly be said that the normal sequel to the operative treatment of senile cataract and cataracts of a similar character is useful and effective vision. For this reason prognosis must be considered from a rather different point of view from that which would be adopted in conditions with a lower percentage of favourable results.

Before submitting himself to an operation for cataract a patient is naturally not entirely satisfied by the statement that 90 per cent. or 95 per cent. of operations have a satisfactory result. He will wish to know whether he is likely to be among the 90 favourable ones, or the ten of which the result may be less favourable. It is convenient to consider the conditions which may produce an unfavourable result under three headings: (1) those affecting the operative result; (2) those affecting the immediate visual result; and (3) those affecting the remote visual result.

Operative Result

There are certain conditions which in the past have had a disastrous effect upon the cataract operation. The most important of these is *septic infection*. Within quite modern times it has been the rule for 2 per cent. or even more otherwise satisfactory operations to terminate disastrously owing to this cause. It can be safely said that at the present time this complication is practically excluded by careful bacteriological examination before operation, and by suitable treatment in those cases where the culture reveals infection with dangerous organisms. Infection is almost invariably derived from the conjunctiva, not from the instruments used or the hands of the operator, and consequently attention paid to the conjunctival condition has provided almost complete freedom from this most dangerous complication.

Second to septic infection in its incidence but more destructive in its action owing to the implication of the other eye comes *sympathetic inflammation*. The causes of this complication are by now fairly well understood, though the actual ætiology is still a matter for discussion. Such knowledge as we have, though still not complete, has enabled this risk to be reduced to almost negligible proportions by studious attention to operative technique.

Expulsive *hæmorrhage* occurring at the time of operation invariably means destruction of the eye; fortunately it is a very rare complication. I have never experienced a case in my own series of operations, though I have seen two in a period covering over 22 years. Hæmorrhage occurring after the operation, though an annoying condition affecting and prolonging convalescence, is very rarely indeed serious in other respects. This is fortunate, since while intraocular hæmorrhage may occur as the result of undue activity on the part of the patient or of actual injury to the eye, it also occurs in a number of cases with no apparent cause on about the fifth or sixth day.

With modern methods the question of *maturity of the cataract* does not usually affect the time at which the operation can be performed, nor the success of the operation, and, consequently, the only question which is considered is the degree to which disablement by defective vision has progressed. A more serious condition is that of *hypermaturity*, since this may make the operation definitely more difficult. Even here, however, recognition of the condition with which one has to deal, knowledge of the difficulties which it may impose on the operator, and readiness to adapt the technique to meet these difficulties makes hypermaturity a circumstance which will affect but little the chances of success.

The existence of a *diabetic condition* in senile cataract, whether one regards it as incidental, as the cause of the cataract or, as is most probably correct, as a partial cause, does certainly affect both the operation and the subsequent course of the case. Complications from this cause may be very much reduced by careful medical treatment on modern lines before and after the operation. It should, however, always be pointed out to the patient, his doctor, or a responsible relative, that such a condition is quite likely to prolong convalescence and make the total period up to restoration of vision considerably greater. Furthermore, it is wise as a rule to make the operative procedure as simple as possible by omitting an iridectomy, if this can safely be done.

Immediate Visual Result

The immediate visual result of cataract extraction depends partly on the success of the actual operation and partly on the initial visual capacity of the eye. When the formation of the cataract has been observed from an early period the surgeon will have been able to note, while the cataract is still immature, the condition of the retina, and so will have good reason to believe that it is free from old inflammatory or degenerative changes. Such a belief does not of course amount to a certainty, because changes may have occurred since the cataract became too advanced for observation of the retina to be practicable.

In a considerable proportion of cases, however, the surgeon does not see the patient until the cataract is far advanced. In these he may be able to infer from the healthy condition of the better eye that the eye which is to be subjected to operation is likely to be normal apart from the cataract, but in these cases it is not possible to be so certain of the integrity of the retina. But there may be changes in the retina of the better eye, or the patient may have other disorders which increase the possibility of *retinal disease*. Such disorders include diabetes, especially when accompanied by increased blood pressure, arterio-sclerosis, or renal disease, or any of the three latter by itself. In such cases a careful estimate must be made from the duration and severity of the disease of the likelihood of affection of the retina. But even if it is affected, operation for cataract may still be advisable, since none of these conditions is likely to affect the vision as seriously as a mature cataract would do. But it must be remembered that the outlook for good vision following operation may be less favourable where the retina is diseased, and the medical attendant, though not necessarily the patient, should be warned of the possibility.

The most disappointing cases are those in which a perfect operative result is obtained, and then *macular degeneration* is found. This usually means that reading is quite impossible, though the vision is definitely improved. Gross retinal disease, such as detachment of the retina or very large patches of choroido-retinal degeneration, can usually be excluded by a careful examination of the light projection before operation, but there are no really satisfactory tests for the integrity of the macula. In some cases the presence of *vitreous opacity*, either as a result of previous inflammatory conditions or as an apparently primary degenerative change, may prevent the attainment of full vision, though the operation is completely successful in other respects. It is rare, however, for the vitreous opacity to be so gross as to prevent the attainment of vision that is reasonably useful for ordinary purposes, and even for reading, though the effect of floating opacity may be rather disturbing to the patient.

The operation mainly employed in this country is one of *extracapsular extraction*. In a certain proportion of cases after operation the capsule is so thin and unwrinkled that perfectly satisfactory vision is obtained within a few weeks of operation and without any further operative procedure. In most cases, however, the capsule is more or less opaque and the operation of *capsulotomy* must be performed, preferably within four or five weeks of the extraction, in order to give a satisfactory and permanent visual result. Some surgeons, in fact, prefer to do a capsulotomy in nearly all cases. Occasionally, where the capsule is thin, so that the vision is in the neighbourhood of 6/9, but the vitreous is cloudy, capsulotomy may have the effect of making vision slightly worse instead of better, owing to the projection of a knuckle of cloudy vitreous through the capsulotomy opening into the anterior chamber. Usually this cannot be foreseen. If, however, the vitreous is known to contain opacity it may be wise to avoid or at all events postpone capsulotomy. In cases where the needling of the capsule has resulted in a slight lowering of vision the sight often improves with lapse of time, though the process may take one or two years.

All patients submitting to cataract extraction should be warned that a slight second operation will probably be necessary a few weeks after the first, otherwise they may be disappointed at finding that the extraction has not completed the process.

Remote Visual Result

In the vast majority of cases of successful cataract extraction the good immediate visual result is maintained for the rest of the patient's life-time. Recently, since attention has been directed to the treatment of *retinal detachment* by modern operative methods, a number of cases have been reported in which detachment has occurred at varying periods after removal of cataract. This unfortunate sequel appears to be much more common after removal of juvenile cataract than after operation for the senile variety. It is probable that this is owing to the greater duration of life after operation and the consequent greater length of time available for the development of those changes which lead to detachment. It is certain that loss of vitreous during the operation is a serious factor in the production of this condition. At the present time the number of retinal detachments in aphakic eyes which have been cured by operation is small, but it seems probable that with increasing experience better results may be obtained. Occasionally *glaucoma* may threaten vision after cataract extraction. In some cases at least this is the result of a too extensive opening being made by capsulotomy. Hernia of the vitreous forward through the opening is almost invariable, and if the opening is large vitreous may almost fill the anterior chamber and a rise of pressure is definitely likely. It may be possible to check this rise of tension by medical or surgical methods, but the prognosis is correspondingly less good. Sometimes late inflammatory reaction may affect the visual result; in most cases this is due to an imperfect operation, either from faulty technique or from unavoidable difficulties encountered during the operation. In other cases it is due to general conditions which might cause inflammation in an intact eye. It is hardly necessary to say that as far as possible such conditions should be eliminated before operation is undertaken.

This list of possible complications sounds rather formidable; but many of them are avoidable, and the others are rare. The actual prognosis for visual acuity in ordinary senile cataract is extremely good.

MAURICE WHITING, M.B., F.R.C.S.,
Surgeon, Royal London Ophthalmic Hospital; Assistant Ophthalmic Surgeon, Middlesex Hospital.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Capts. L. Warren, O.B.E., to *Drake* for R.N.B., and E. MacEwan to *Queen Elizabeth* as Fleet M.O., on staff of C.-in-C., and as specialist in hygiene.

Surg. Lt.-Comdrs. E. C. Davis to *Victory* for Haslar Hospital and to *President*, additional, for promotion course; G. A. Miller to *Harrier*; J. J. Benson to *Dryad*; and T. F. Barlow to *Carlisle*.

The Gilbert Blane Medal for the year 1934 has been awarded to Surg. Lt.-Comdr. T. C. H. Neil.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. E. G. Thomas to *Effingham*

Proby. Surg. Sub-Lt. T. H. Pierce to *Victory* for Haslar Hospital.

ROYAL ARMY MEDICAL CORPS

The undermentioned Lts. to be Capts.: L. G. Irvine, and W. F. L. Fava.

Lt. (on prob.) H. V. D'A. Iles is restd. to the estabt.

Lt. (on prob.) J. Morgan resigns his commn.

SUPPLEMENTARY RESERVE OF OFFICERS

The undermentioned Lts. to be Capts.: D. T. Maclay, W. S. C. Copeman, J. N. Leitch, and C. D. Evans.

TERRITORIAL ARMY

Maj. R. W. Swayne, O.B.E., on ceasing to be empld. retires and retains his rank, with permission to wear the prescribed uniform.

Capt. E. J. Fitzgerald resigns his commn. on appt. to the Supp. Res. of Off.

ROYAL AIR FORCE

Group Capt. F. C. Cowtan to Princess Mary's R.A.F. Hospital, Halton, for duty as commanding officer.

RESERVE OF AIR FORCE OFFICERS

Flight Lt. (Honorary Squadron Leader) T. M. Walker ceases to be employed with the Regular Air Force, and relinquishes his commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

INDIAN MEDICAL SERVICE

Maj. F. Oppenheimer to be Lt.-Col.

COLONIAL MEDICAL SERVICE

The following appointments have been made: Dr. R. D. Fitzgerald becomes Director of Medical and Health Services, Straits Settlements, and Adviser for Medical and Health Services, Malay States; Dr. G. H. Garlick, Principal Medical Officer, Johore; Dr. J. D. Robertson, Medical Officer, Zanzibar; Dr. E. A. Seagar, Government Medical Officer, Turks and Caicos Islands; and Dr. H. O. Watkins-Pitchford, Medical Officer, Kenya.

SPECIAL ARTICLES

OBESITY IN CHILDHOOD

A STUDY OF FIFTY CASES

By R. W. B. Ellis, M.D. Camb., M.R.C.P. Lond.
IN-PATIENT MEDICAL REGISTRAR AND PATHOLOGIST, HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET, LONDON; AND

K. H. Tallerman, M.C., M.D. Camb., M.R.C.P. Lond.
ASSISTANT PHYSICIAN TO THE CHILDREN'S DEPARTMENT, THE LONDON HOSPITAL; PHYSICIAN TO THE PADDINGTON GREEN CHILDREN'S HOSPITAL

(*From the Children's Department, the London Hospital*)

Obesity is relatively common in childhood and early adolescence, but there is considerable uncertainty as to its significance—in both lay and medical minds. Not only are large numbers of otherwise healthy children empirically treated with thyroid extract, but it is extremely common to find fat children, especially boys, labelled as examples of Fröhlich's syndrome without any confirmatory evidence whatever. This is often done before the normal age of puberty has been reached, at a time when it is exceedingly difficult if not impossible to diagnose hypogenitalism, and when it is clearly out of the question to be guided by the non-existence of secondary sexual characters.

The following investigation was undertaken with particular reference to the occurrence of demonstrable pituitary disorder in 50 children between the ages of five and fourteen years, whose weight was found to be not less than 25 per cent. above the average for both their age and height. Most of them were brought to hospital, or referred by school medical officers, on account of obesity, but some were seen for secondary symptoms such as dyspnœa or pains in the knees. Information was obtained about race, family history (with reference to obesity), the approximate age of onset, the appetite and type of diet, general activity, and the occurrence of headache, vomiting, and visual and urinary disturbances (polyuria and polydipsia); inquiry was also made about any possible predisposing cause. The patients were examined with particular reference to the distribution of the obesity, the presence of striæ atrophicæ, genital development, secondary sexual characters, the condition of the fundi and visual fields, and the blood pressure. A stereoscopic X ray examination was made of the sella turcica; the urine was examined for albumin and sugar, and in 38 instances glucose-tolerance tests were carried out.

In those cases in which treatment was attempted, the patients were given a diet essentially of high protein and low carbohydrate content, with a total caloric value approximately that appropriate for age. Only in selected cases which were clearly failing to respond to this therapy was thyroid administered.

The Findings

SEX, RACE, AND AGE

Of our series of 50 cases 25 were boys and 25 girls. The race was recorded because it was thought that the diet used in the average Jewish household of hospital class might be found to be especially inducive of obesity. The figures, however (48 per cent. Jewish to 52 per cent. non-Jewish), do not differ materially from the proportionate out-patient attendance. The age of onset was as follows:—

Infancy	13	10–12 years	11
5–7 years	7	12–14 years	3
7–10 years	16		

In 11 instances in the last two groups the obesity was found to coincide with, or immediately precede (within six months), the appearance of the first evidences of puberty (pubic hair, mammary or genital development, menstruation). These cases have been regarded as primarily endogenous in origin.

It will be seen that the onset in the largest group was between the ages of seven and ten years, and with two possible exceptions (in which the condition followed scarlet fever and mumps respectively) these cases appeared to be primarily exogenous in type. All showed a tendency to over-eat, particularly of carbohydrate foods. One of the most striking examples was that of a girl whose mother had bought a sweet shop four months previously.

INFECTION

The rôle of infection in the causation of obesity is apt to be assumed on insufficient evidence, especially when the coincident factors such as good food, rest, and prolonged convalescence are taken into account. Obesity of sudden onset, sometimes accompanied by other symptoms such as polyuria and polydipsia, has, however, been recorded following specific fevers, chorea, &c., sufficiently often to suggest the possibility of a definite causal relationship in some instances.

In the present series the condition dated from scarlet fever in three cases and from mumps in one.

Case 1.—Female, weighed 163 lb., aged 12 years (average for height 113 lb.). Obesity followed scarlet fever at 6 years (within six weeks of onset of disease). Poor response to dietetic treatment. Some increased carbohydrate tolerance (maximum rise from 0·09 to 0·112 per cent. in one hour). Onset of menstruation at 11 years.

Case 2.—Male, weighed 114½ lb., aged 11 years (average for height and age 77 lb.). Obesity followed scarlet fever at 8 years (first noticed eight weeks after onset of disease). Responded well to diet. Sugar tolerance not increased (rise from 0·095 to 0·160 per cent. in half an hour). Onset of puberty aged 12½ years.

Case 3.—Male, weighed 128½ lb., aged 13 years (average for height and age 88½ lb.). Rapid onset (less than six weeks) following scarlet fever, aged 4 years. Diet refused. Sugar tolerance not investigated. Pubic hair present, aged 13 years.

Case 4.—Female, weighed 87½ lb., aged 10 years (average for height and age 65 lb.). Gradual onset of obesity following mumps at age of 7. Diet not attempted. No increase in sugar tolerance (rise from 0·086 to 0·132 per cent. in one hour).

In the first three cases the onset appeared to be relatively rapid, with a short latent period after the scarlet fever. In the fourth, in which the obesity was of more gradual onset, it was not possible to determine the latent period. Unfortunately, also, this child was lost sight of before the normal age of puberty had been reached, since the possibility of mumps affecting the ovarian function must be considered.

A fifth child, a boy, showed a rapid and excessive gain in weight after chorea at the age of nine, and he continued to gain weight after return home. In none of these cases, however, was there any confirmatory evidence of hypothalamic disturbance, and in the last (following chorea) one would hesitate to attach much importance to the history on account of the coincident limitation of exercise and increased home care. In no case in our series was there any history to suggest that the condition followed encephalitis lethargica.

FAMILY HISTORY

It was found that there were one or more members of the immediate family affected in 30 out of 50 cases. Of the parents, the mother, but not the father, was grossly overweight in 13 instances, the father, but not the mother, in 6, and both parents in 3. Siblings alone were affected in 8 cases. The most striking example of familial incidence occurred in a family consisting of two sisters (Fig. 1) and the two parents, who were both obese and were first-cousins.

CARBOHYDRATE TOLERANCE

On the basis of the criteria discussed below (age-incidence, family history, customary diet, &c.), the patients who could be so classified were divided into two groups, whose obesity was regarded as primarily of endogenous and primarily of exogenous origin respectively. Glucose-tolerance tests, using 1 g. glucose per kg. body-weight (to a maximum of 50 g. glucose), were carried out on 19 patients in each group after approximately 15 hours' fast, and blood-sugar values were obtained at half-hourly intervals up to 2½ hours. The following composite curves were obtained from the two groups by averaging the values obtained in each instance. The mean deviations from the mean (expressed in mg. per 100 c.cm.) were :—

	Endogenous group	Exogenous group.
Fasting	±11	± 9
½ hour	±23	±14
1 "	±23	±10
1½ hours	±19	±14
2 "	±14	±16
2½ "	±22	±15

It is clear from these figures that although the mean deviations from the mean are considerable (and show a wider range in the endogenous than in the exogenous group) the average values (Fig. 2) are consistently lower in the former than in the latter. Both composite curves are essentially within normal limits, but a comparison of the two suggests that there is a slightly greater carbohydrate tolerance in the endogenous than in the exogenous type of obesity. In the complete series, 5 cases showed a markedly increased tolerance as evidenced by a rise of blood-sugar of less than 10 mg. per 100 c.cm. after the loading dose of glucose. These cases were all in the endogenous group. In no instance was there glycosuria. This is consistent with the observations of Goldblatt, Forest Smith, and Gardiner-Hill,[1] who found that in exogenous obesity the tolerance to carbohydrate was normal or diminished, although oxidation was in general good, whereas cases of endogenous obesity under twenty years of age showed increased carbohydrate tolerance with excellent oxidation.

PHYSICAL CHARACTERS

The majority of patients in the present series were slightly above the average height for their age and sex, and were of florid complexion. There appeared to be singularly little limitation of activity resulting from even the severe degrees of obesity, though pains in the ankles and backs of the knees were complained of in 7 instances, and there was obvious pes planus and genu valgum deformity in 5. In 3 cases the deposition of fat was sufficient to cause the appearance of fine striæ atrophicæ on the shoulders, thighs, or chest. (These were not, however, at all comparable in size with the striæ seen in cases of gross endocrine dysfunction, such as pituitary basophilism.) The intelligence was within the normal in all except 5 children, who attended mentally defective schools. Two of the latter showed other congenital abnormalities—one a first-degree hypospadias and undescended left testicle (though the right developed normally at puberty), whilst the other boy showed bilateral congenital cataract, vitiligo, and a scattered distribution of white hair (the normal being brown). The basal metabolic rate was not estimated, but in no case did the physical appearance, activity, or pulse-rate suggest any gross degree of hypothyroidism.

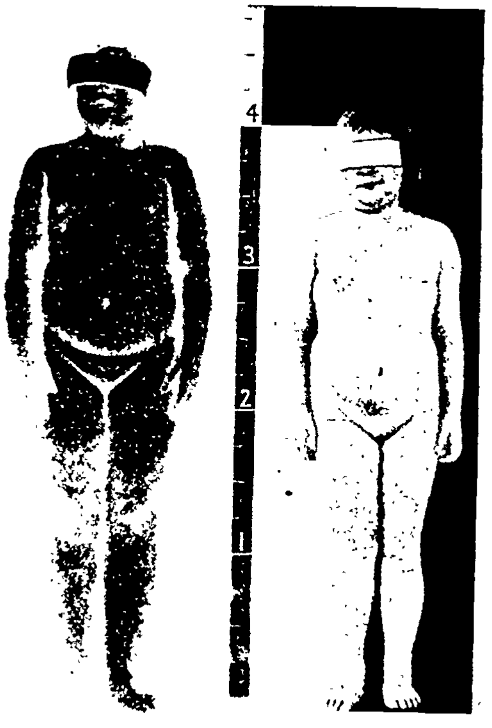

FIG. 1.—Familial obesity. Two sisters ; one aged 12, weighing 123 lb. (normal 81½ lb.), and one aged 10, weighing 89 lb. (normal 64 lb.). Both showed increased carbohydrate tolerance. The parents were first-cousins.

Blood-pressure estimations were carried out with the mercury sphygmomanometer in 40 cases in the out-patient department, after the patients had been at rest for at least half an hour and had lain supine for five to ten minutes. An average of three readings was taken in each case. The following results were obtained :—

Systolic Blood Pressure (mm. Hg).

	Cases.		Cases.
110 to 120	5	150 to 160	4
120 to 130	5	160 to 170	2
130 to 140	11	170 to 180	2
140 to 150	10	184	1

The last three values were recorded in three boys between 13 and 14 years of age, who weighed 224 lb., 179 lb.,' and 171 lb. respectively. The average value for the whole series was 143 mm.

While allowing for certain inevitable mechanical inaccuracies in taking blood-pressure readings on obese patients (e.g., the distance of the arm band from the artery), and the difficulty in standardising rest and emotional factors in the out-patient department, there does appear to be a definite tendency for obese children to have a raised blood pressure under conditions of everyday life. To judge from the relatively small number of these patients whom it was possible to admit to the ward for observation, however, the blood pressure falls rapidly toward the normal when the patient is in bed and completely at rest. The explanation of this may well be a mechanical one. The whole body is working at a mechanical disadvantage, and the actual amount of weight-lifting to be done is grossly in excess of that required of the normal child.

VISUAL FIELDS, SELLA TURCICA

In no instance was there any gross abnormality of the visual fields or of the sella turcica as shown by stereoscopic X ray examination. It was not possible to carry out an investigation of fluid intake and urinary output in more than 8 cases, but in none of these was there a condition of diabetes insipidus, and in none of the remainder was there a history of excessive thirst or polyuria or urinary abnormality.

Frequent *headaches* which were not directly attributable to errors of refraction were complained of in 7 instances, and one of these children suffered in addition from attacks of petit mal type. In no case was there associated vomiting, papillœdema, or other evidence of increased intracranial pressure. It is possible that the raised blood pressure (see above) found in the majority of these children may in some instances be related to the occurrence of headache, though it was not in fact found that the children with the highest blood pressures were those who complained of this symptom.

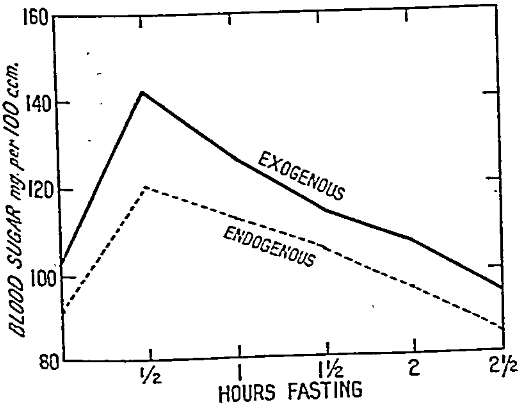

FIG. 2.—Composite carbohydrate-tolerance curves of endogenous and exogenous groups.

It can be said that as far as these investigations go, no evidence was found in any case in this series of tumour of the pituitary or suprapituitary region.

Discussion

In considering the ætiology of obesity, a more or less arbitrary classification into endocrine, endogenous, and exogenous types is often employed. This has a certain value if the limitations of the classification are recognised and the terms defined. By *endocrine obesity* we would describe those cases in which an excessive deposition of fat (as distinct from myxœdematous tissue) occurs as one symptom of a well-defined abnormality of one or more of the endocrine glands. Examples of this type are cases of the adrenogenital syndrome, in which hyperplasia or tumour of the cortex of the adrenal is associated with obesity, hirsutes, high blood pressure, and (in females) hirsutes and amenorrhœa; Cushing's[2] syndrome, a closely similar (if not identical) clinical type, in which a plethoric facies and a peculiar abdominal localisation of the obesity is associated with very large striæ atrophicæ and an adenoma of the basophil cells of the anterior pituitary; and the adiposogenital (Fröhlich's) syndrome, in which there typically occurs a girdle distribution of fat and hypogenitalism. When this last condition arises in childhood there is usually some degree of statural infantilism in addition. Many of the cases of Fröhlich's syndrome that have been described have been found to have been due to a tumour arising from Rathke's pouch, which presumably has damaged by compression both the anterior lobe of the pituitary and the neighbouring centres at the base of the brain. It is now generally held that the symptoms of sexual and statural infantilism are to be attributed to hypopituitarism, whilst the associated symptoms of obesity, diabetes insipidus, &c., which may occur are probably attributable to dysfunction of the hypothalamus (Cushing[3]). It is therefore only justifiable to speak of pituitary obesity (as exemplified by Fröhlich's and the Laurence-Moon-Biedl syndromes) when there actually are symptoms of pituitary dysfunction in addition to the obesity. Confirmatory evidence of a tumour, when such exists, may be found in constriction of the visual fields, papillœdema, or other evidence of raised intracranial pressure, whilst the sella turcica may be seen on X ray examination to be expanded or otherwise deformed. Craniopharyngiomas arising from Rathke's pouch may be situated either within or above the sella turcica (Cushing[3]).

Obesity due to hypothyroidism is characterised by a lowered basal metabolic rate, slow pulse, dry skin, and lethargy. Other examples of obesity associated with primary carcinoma of the thymus (Leyton, Turnbull, and Bratton[4]), tumours of the pineal body, and castration have been described.

The *endogenous* factor in obesity may be said to be the personal factor or peculiarity of individual metabolism which will cause a person to become stout on a diet on which another would remain stationary in weight. Strictly speaking, all types of endocrine obesity might be regarded as "endogenous," and, on the other hand, it may be urged that all endogenous cases are really due to endocrine dysfunction which our present methods of investigation are inadequate to recognise.

It does seem reasonable, however, at present to limit the term endocrine obesity to those cases where there is confirmatory evidence of involvement of one or more of the endocrine glands, and endogenous obesity to those in which there appear to be other factors involved in addition to excessive caloric intake and inactivity. Where the obesity is clearly determined by excessive appetite and food intake, with or without diminished activity, the term *exogenous* obesity is applicable.

It is obvious that such distinctions cannot be pressed too far, and the existence of a pure endogenous type has been questioned. Newburgh[5] has pointed out that not only is the actual food intake apt to be grossly under-estimated by the patient, but that the fluid content of the diet must also be taken into account, and that estimations of fluid intake and urinary output as usually carried out will give no indication of the amount of fluid retention. He regards obesity as essentially exogenous and associated with no specific metabolic abnormality.

Dunlop and Murray Lyon,[6] in a large series of cases of all ages, found only 8·2 per cent. which they regarded as definitely endogenous, 37·2 per cent. probably exogenous, and "the remaining 53·6 per cent." probably of mixed type.

If it is admitted that excessive obesity cannot occur in the absence of an adequate caloric and fluid intake in relation to the energy output, and that therefore there is to some extent an exogenous factor operative in every case, there nevertheless remains a considerable group of cases in which the occurrence of the obesity at a particular age-period, or a strong family history of the condition, suggests that there may be a primary endogenous factor at work as well. In children it is perhaps easier to determine this than in adults as in many instances the onset of the obesity can be more accurately dated, and there is no period corresponding to the menopause when possible endogenous factors are obscured by decreased activity and increased caloric intake. In considering the present series of cases, we have taken as evidence of an endogenous factor the onset of obesity in infancy or immediately preceding puberty, the existence of a convincing family history, and in certain instances the occurrence of an acute illness (see above) coinciding with or immediately preceding the obesity. It must, of course, be recognised that in some cases obesity dating from infancy simply represents overfeeding since this time, though in general it is found that the overweight infant (particularly when breast-fed) tends to gravitate rapidly toward the average during the toddler period. Similarly the occurrence of obesity in several members of a family may be attributable to the type of house diet and a mutual stimulus to over-eating rather than to a familial peculiarity. Whilst therefore any classification on these lines is admittedly tentative and the majority of so-called endogenous cases are really of mixed type, we have distinguished 19 cases in which the available evidence indicated an endogenous factor and 23 in which excessive appetite and diet alone accounted for the condition. The carbohydrate tolerance in these two groups has been discussed. The remaining cases could not be classified on the evidence available.

With regard to the endocrine type of obesity, it may be said that no case in this series showed any confirmatory evidence of pituitary dysfunction, and whilst hypothyroidism cannot be absolutely excluded in the absence of estimations of basal metabolic rate, it was in no case suggested either by the pulse-rate, physical appearance, or general activity.

The *distribution* of the obesity is a point of some importance, and one which is very often called in evidence of a pituitary factor in such cases. It is certainly true that the classical examples of Fröhlich's syndrome show a striking girdle distribution of fat on the trunk, with excessive deposition in the mammary region, hips, buttocks, lower abdomen, and pubis. The extremities are relatively little involved, and the hands and feet tend to be small and delicate. When such a distribution is very well marked, and particularly if it is associated with some degree of statural retardation, it undoubtedly has diagnostic significance. Examination of these 50 children, however, showed clearly that this general type of distribution of fat on the trunk may occur in *any* fat child, whether the obesity is primarily of endogenous or exogenous origin. Indeed, these sites of deposition appear to be the most frequent, the extremities seldom being affected to a corresponding extent in childhood. The resulting pseudo-feminine contours seen in boys, due to the wide hips, triangular pubis, and apparent mammary development had caused many of them to be regarded as examples of the adiposogenital syndrome; this is illustrated by Figs. 3 and 4. (There is, of course, no true mammary development, the nipples being actually retracted into the fatty tissue of the chest.) It may also be mentioned that the diagnosis of hypogenitalism before the normal age of puberty is extremely difficult in boys and impossible in girls. All those patients in the present series in whom it was suspected reached puberty normally. In fat boys the penis and testicles tend to be retracted into and overhung by the fat of the pubis. Even testes which during early childhood appear atrophic may subsequently develop normally. It was in fact found that every patient of the series who could be followed to the age of fourteen (31 in all) had by that time shown some evidence of the onset of puberty.

It has already been mentioned that the majority of these patients tended to be slightly above rather than below the average height for their age and sex, and in no case was there appreciable statural retardation. In 7 instances the height was that of an average child three to five years older, but as these measurements were all made about the period of puberty, when the normal variation is very considerable, it is probably unnecessary to postulate a condition of

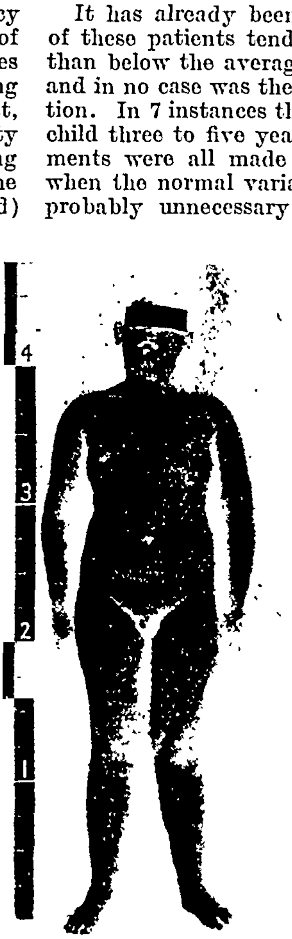

FIG. 3.—Boy, aged 10¾, weighing 108 lb. (normal for height 80 lb.). Pseudo-feminine appearance, due to deposition of fat on breasts, abdomen, and hips. Genu valgum and pes planus. Normal puberty at age of 14. Obesity of mixed type.

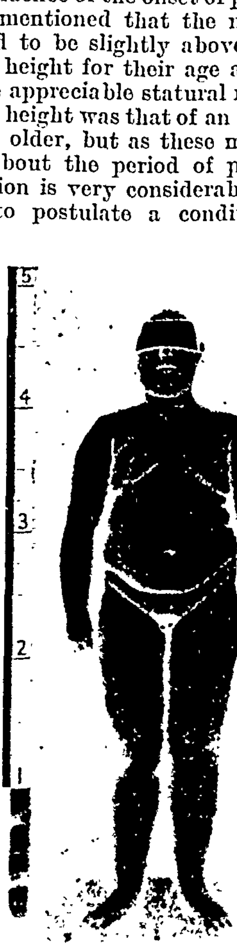

FIG. 4.—Boy, aged 11, weighing 145 lb. (normal for height 88 lb.). Apparent hypogenitalism due to retraction of genitalia beneath fat of pubis. Retraction of nipples. Normal puberty at age of 13. Obesity of exogenous type.

hyperpituitarism to account for them. (It is said that obesity of "hypopituitary" type may be preceded by hyperpituitarism). In none of these cases was the onset of puberty abnormally delayed, but in one Jewish girl it appeared unusually early (pubic hair being present and menstruation occurring at 9½ years of age). Here again, however, the early onset of puberty could certainly be paralleled in many normal children.

The following is an extreme example of the type of "florid" obesity (Fig. 4) to which the majority of these children conformed.

CASE 5.—The patient, a boy, had been overweight since infancy, but had increased rapidly in weight since 11 years of age. No family history of obesity. Appetite always excessive, with particular fondness for carbohydrate; always eating between meals. High colour, extremely active and cheerful, complaining only of pains in backs of knees. At 11½ he weighed 166 lb. (normal for age 77 lb.). When aged 13 (see photograph) he weighed 204 lb. (normal for age 88 lb., normal weight for height 110 lb.), and measured 5 ft. 4½ in. (normal 4 ft. 10 in.). Blood pressure 170/130. Blood-sugar showed a rise from 0·096 per cent. to 0·147 per cent. half an hour after the ingestion of glucose, and a fall to the fasting level in 1½ hours. At 14 years of age the boy weighed 224½ lb., and pubic hair had begun to appear. Genital development was subsequently normal. He showed fine striæ on breast, loins, abdominal wall, and axillæ. Discs, visual fields, and sella turcica normal.

The group as a whole illustrates the fallacy that may easily arise from treating cases of this type with one of the many pituitary or "bombshell" endocrine preparations at present on the market. Even supposing an active preparation is obtained, anterior pituitary extract can only be expected to influence growth and genital development. It is therefore only logical to employ it in those cases in which there actually exists some degree of statural or genital infantilism. Had it been used in the treatment of any of these cases which showed a girdle distribution of obesity with apparently small genitalia during later childhood, the occurrence of puberty at the normal time might easily have been regarded as due to the readjustment of the condition of supposed hypogenitalism. Actually it was seen that the onset of puberty occurred normally in the absence of endocrine therapy.

Treatment

Before instituting treatment one should decide whether it is really necessary in the particular case, and if it be embarked on, whether there is any prospect of the patient and parent carrying out the instructions conscientiously. This must be determined to a large extent by the severity of the symptoms. If there is appreciable interference with normal activity, dyspnœa on exertion, pains in the legs with or without deformity, or discomfort such as may occur from distension of the skin with fat or from pendulous abdomen or breasts; or if the child's physical appearance is such as to render her hypersensitive and wretched, it will be worth while attempting treatment. On the other hand, if the child is in good general health and in no way personally concerned with the condition, failure in any form of dietetic treatment is almost a foregone conclusion, and even if the patient can be persuaded to fall in with the vagaries of parent and physician, it is doubtful how much good will really have been achieved. Although it has not been possible to observe the present series of patients throughout adolescence, it is well known that the majority of overweight children tend to gravitate toward the normal after puberty has been reached, and diabetes (the bogy of the obese adult) does not appear to exercise the same selection in childhood. There is also some reason to believe that if too vigorous dietetic measures are employed, the obesity will only be remedied at the expense of growth. A similar objection applies to thyroid administration in cases which give no clear evidence of thyroid deficiency. Whilst with large doses it will probably be possible to make obese children lose weight, the interference with general health and nervous stability is likely to be disproportionately great.

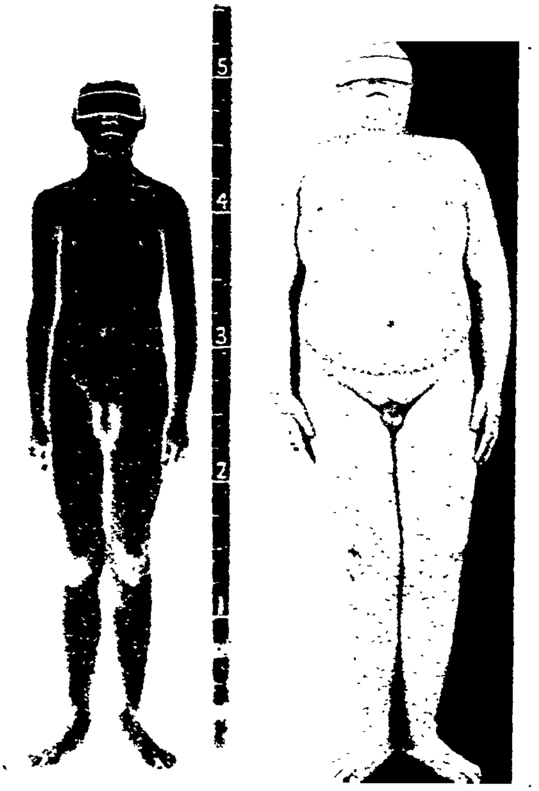

FIG. 5.—"Florid" obesity. Boy, aged 13 years, with contro of same age. Weight 204 lb. (normal for height 110 lb.). Height 64½ in. (average for age 58½ in.).

The limitations of dietetic treatment amongst patients of the poorer hospital class, such as those of our series, are very great. Not only is a high protein, low carbohydrate diet relatively expensive, but the preparation itself of a daily diet different from that of the rest of the household is often wholly impracticable. The most striking result obtained from dieting was in the case of a girl of nine years, weighing 100 lb., whose father was on an obesity diet and whose mother (the only other member of the household) adopted the same diet for convenience. The child gradually lost 25 lb. in the first six months, and then remained approximately stationary in weight for a further three months, although she grew normally and her general health improved. In the majority of cases, however, the most that can be expected is that the weight will remain stationary, or fall slightly, whilst normal growth continues, the child thus tending to "grow up to its weight." A careful inquiry should be made into the details of the daily diet, and suggestions given as to the limitation of specific items, particularly bread, sweets, potatoes, and fried foods, and the elimination of eating between meals. A general diet sheet of foods to eat and foods to avoid was given to each case in which any treatment was attempted (39), and a detailed weighed dietary to 8. Of the 21 patients who adhered at all strictly to the recommendations, the number who obtained any appreciable benefit from them (as judged by a stationary or falling weight) was 12. Since these cases were treated as out-patients and accurate supervision of the diet was impossible, no hard-and-fast conclusions can be drawn with regard to these results, but in general it may be said that those patients in whom there was operative an endogenous factor (puberty) tended on the whole to respond less well to diet than those in whom appetite and overeating were the principal factors. In these latter patients, substitution of green vegetables and salads for potatoes and bread was generally found to allay hunger and bring about a gradual decrease in appetite.

Thyroid treatment, starting with gr. ¼ b.d. and increasing gradually until an appreciable tachycardia occurred, was tried in 8 cases that had failed to respond to dietetic treatment, but in only one instance was there any convincing improvement. It seems probable that unless the drug is given to children in doses incompatible with normal health, any effects it may have on metabolism are counterbalanced by an increased consumption of food.

Summary and Conclusions

1. In 50 cases of obesity in childhood no evidence was found of statural or genital infantilism, nor of intracranial tumour in the pituitary region. None of these cases justified the description of "Fröhlich's syndrome" which had in most instances been applied.

2. A tendency to the girdle distribution of fat was seen in both endogenous and exogenous cases, and was in no instance associated with a delayed onset of puberty.

3. The majority of cases showed a considerably raised systolic blood pressure under conditions of everyday life.

4. Glucose-tolerance tests indicated an increased carbohydrate tolerance in a group of cases regarded as primarily endogenous in type (in view of family history, age of onset, &c.) as compared with cases primarily exogenous in type.

5. It is recommended that dietetic treatment should only be undertaken in cases in which the obesity gives rise to symptoms, and should never be sufficiently rigid to interfere with normal growth.

6. Treatment with thyroid or pituitary extracts is held to be contra-indicated in the absence of definite evidence of hypothyroidism or statural and genital infantilism respectively.

We wish to thank Dr. Maitland-Jones for permission to report cases under his care, and the members of the hospital staff who have assisted in the investigations.

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A SPALDING NURSES' HOME.——A new nurses' home, which has been erected in the grounds of the Spalding Johnson Hospital at a cost of £2500, was recently opened by Mr. Ashley K. Mapley, the senior trustee of the hospital.

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF OBSTETRICS AND GYNÆCOLOGY

MR. S. GORDON LUKER (Bournemouth), a vice-president, took the chair at a meeting of this section at which a paper on the

Treatment of Chronic Cervicitis by the Diathermy Cutting Current

was read by Mr. J. C. AINSWORTH-DAVIS (London). For the past 18 months, he said, his attention had been more and more drawn to the fact that chronic cervicitis was responsible for certain diseases of the urinary tract whose ætiology had been imperfectly understood; this conclusion was supported by clinical observation, by experimental evidence, and especially by the results following operative treatment. Any urological out-patient department was overcrowded with women whose chief symptoms were dysuria, frequency of micturition, pain in the loins, and backache. Many were referred from the gynæcological department with a note "will the urologist please see and treat ?" In the majority of cases no abnormality could be found other than a mild trigonitis and an associated chronic urethritis. Changes might also be demonstrated in the upper part of the urinary tract. The urine was usually sterile, but may contain pus and *B. coli.* The significant thing in most of these women was the presence of some degree of chronic cervicitis. Winsbury-White had demonstrated the spread of infection from the uterine cervix to the urinary tract by means of Indian ink or tubercle bacilli injected into the cervices of rabbits.

The complete cure of this chronic cervicitis necessitated the removal of the lining membrane of the cervical canal and of the pars intermedia, together with all subjacent cervical glands. Non-surgical procedures gave unsatisfactory results. Complete amputation of the cervix would certainly remove the infected tissues but this operation was not to be recommended in young women anxious to bear children. Dilatation, followed by the cautery, failed to destroy the deep glands. The ideal method of complying with the essentials of treatment was to remove the glandular tissue completely by means of a wire loop activated by the diathermy cutting current. Mr. Ainsworth-Davis had been unable to use successfully Williams's coniser. He went on to describe in detail his own instrument and emphasised the necessity for the use of a non-inflammable antiseptic. As each strip was cut the bleeding stopped automatically. Saline douches were given 14 days after operation and continued until the cervix had healed, which took two months. The results had been excellent, both clinically and pathologically.

Mr. ALECK BOURNE (London) said he had used this method in a few cases and had found difficulty both in controlling the depth of tissue removed and in controlling severe hæmorrhage.

Mr. W. S. RICHARDSON (Bournemouth) had used the treatment described with great success, as also had Dr. MCCURRICK (Hove). Dr. DUGALD BAIRD (Glasgow) was unable to believe that a relationship between a chronic cervical infection and a chronic urinary infection was as common as Mr. Ainsworth-Davis had declared. In reply, Mr. AINSWORTH-DAVIS stated that experience decided the depth of the strip of tissue removed and slowness of incision, the hæmostasis. A supple scar was left and he did not believe the method led to difficulty in conception or ensuing childbirth.

Sequels of Pregnancy Pyelitis

Dr. DUGALD BAIRD read a paper on the after-results of pyelitis of pregnancy, with special reference to subsequent pregnancy. It was based on 208 cases of pyelitis of pregnancy studied over a period of 1–5 years. Of these patients 74 had had no subsequent pregnancy; 52 per cent. of these did not feel well and 47 per cent. still had infected urine. Some of the patients with urinary infection felt well and some with sterile urine did not feel well. The type of attack gave no indication of whether the infection would clear up or not. Urological examination showed that in many cases there was permanent damage to the kidney. Symptoms complained of were renal pain or pain along the course of the ureters, usually worse before the menstrual period, debility, and occasionally hæmaturia. There had been a subsequent pregnancy in 134 cases; 87 women had one pregnancy (46 of them with pyelitis recurring), and 32 had two succeeding pregnancies (14 with pyelitis in both). As a rule if the urine became sterile before the onset of a second pregnancy, pyelitis would not recur. If the urine remained infected, pyelitis would often recur, dependent on the stasis of urine in the ureters. The exacerbation was in almost all cases less severe than the original attack. In some cases the infection became less severe with successive pregnancies and disappeared spontaneously. In others the infection persisted, giving rise to stricture, hæmaturia, calculus, and uræmia. In a number of these women termination of pregnancy and subsequent nephrectomy were required.

The CHAIRMAN (Mr. Luker) thought that the cases of pyelitis of pregnancy that he had seen were becoming less severe and very rarely required a treatment so drastic as the termination of the pregnancy. Mr. CARNAC RIVETT disagreed. Before the war he had never seen a case. He thought the condition was increasing in frequency and severity. Treatment was not energetic enough, and failure to respond to medicinal measures should at once indicate the necessity for termination of pregnancy. Dr. ETHEL TOWNEND (Hull) also advised early termination of the pregnancy in such cases. Mr. R. A. R. WALLACE (Bishop's Stortford) said that he had not had one single case in 1000 confinements, except one that occurred in the puerperium. Dr. V. B. GREEN-ARMYTAGE (London) wondered whether the use of such drugs as Uroselectan was safe in a woman during an attack of acute pyelitis. Dr. BAIRD, in reply, laid stress on the importance of "forced fluids" in the treatment of these cases.

Chloroform in Midwifery

Mr. R. CHRISTIE BROWN (London) demonstrated a chloroform inhaler for use in normal midwifery. In the first instance it was designed in order to be useful to patients who were attended by midwives. He was of opinion, however, that to put any form of anæsthetic or analgesic into the hands of midwives at present might bring about a rise in the maternal mortality. Before this was done he believed that the following points would have to be considered. The analgesic must be inhaled. Chloroform should be used, for not only did it appear to be safer when used in midwifery but also its name was magic—a fact which was of importance considering that the pain was to a large extent mental. The chloroform must be administered by the patient herself and not by the midwife, thereby preventing any possibility of an overdose. The midwives must not be allowed to purchase the drug in bulk, and, lastly, the apparatus must be small in size and cheap in cost. The inhaler demonstrated was in design (see THE LANCET, 1933, i., 383) like that of the unspillable inkwell and was covered with a small linen bag. The air breathed passed over and not through the chloroform. At the City of London Maternity Hospital the inhaler had been used with considerable success in over 800 cases. When used by doctors a mask could be used which covered the patient's face, which mask could be fitted to the inhaler.

Mr. A. J. WRIGLEY (London) believed Mr. Christie Brown's chloroform inhaler to be a great advance on the chloroform capsules. Mr. CARNAC RIVETT could not understand why anæsthetics were regarded as so much more dangerous in the hands of midwives. He felt they could be entrusted to the midwives with perfect safety to the patients, provided the midwives were instructed in their use. Prof. J. S. ENGLISH (Singapore) compared the inhaler to one designed by Murphy.

Retroversion

The CHAIRMAN read a paper on retroversion of the uterus. Speaking of the wide divergence of opinion about the symptoms which resulted from this malposition, he suggested that confusion had resulted from grouping all cases together. He would classify cases of retroversion of the uterus into the following groups. First, those women who were single and had a congenital retroversion. Most of these patients were unconscious of the condition and of course no treatment was required. He believed that as they grew older increasing retroflexion might result in venous congestion and symptoms of backache, dysmenorrhœa, and pelvic discomfort. Secondly, married women who had a congenital retroversion might complain of dyspareunia or they might seek advice for sterility or, if they became pregnant, miscarriage might result. Treatment was required in these patients. Thirdly, retroversion was acquired after miscarriage or labour. In 200 consecutive confinements he had found that a month after delivery 13 per cent. of the primiparæ had retroversion and 3·5 per cent. of the multiparæ. Should this condition be left untreated backache, dysmenorrhœa, and leucorrhœa would result and the malposition would predispose to future prolapse.

In the treatment of the congenital cases manipulation, if necessary under anæsthesia, should first be tried. A Hodge pessary was left in position for three months, and if the uterus remained in good position nothing further was necessary. Failure to correct the retroversion in a married woman would probably indicate operation. Preventive treatment came first in the cases of acquired retroversion. The puerperal woman should assume a prone position for at least two hours daily. A post-natal examination should always be made at the end of a month and if necessary the malposition should be corrected and a Hodge pessary should be inserted for two months. Pessary treatment was chiefly required as a therapeutic test or as a temporary measure in puerperal retroversion. In Mr. Luker's opinion the indications for operation could be summarised as follows: when the retroversion was fixed or was complicated by adhesions or by chronic pelvic inflammation; when the retroversion was giving rise to symptoms that were increasing, such as backache, menorrhagia, dysmenorrhœa; when the retroversion caused symptoms which disappeared after correction and insertion of a pessary; when the retroversion caused sterility or miscarriage. The operation advised was a modified Gilliam's operation.

Mr. **Christie Brown** said that in post-natal examination of over 1000 women at the City of London Maternity Hospital he had found a retroverted uterus in only 49 cases. Miss **Alice Bloomfield** (London) described a follow-up of cases in which there had been some operation for correction of a retroverted uterus. The impression she had formed was that a permanent relief from symptoms could only be expected when some pathological condition accompanied the retroversion, and that the malposition, per se, seldom caused symptoms. Mr. A. E. **Chisholm** (Dundee) and Dr. **Hutton** (Orpington) disagreed with the last speaker and said they agreed with Mr. Luker that retroversion did account for definite symptoms that were cured by corrections.

Prolapse

Mr. A. C. **Palmer** read the last paper of the day, entitled the Prolapse Syndrome: its Treatment by Vaginal Hysterectomy, with Reconstruction of the Pelvic Diaphragm. By the term prolapse syndrome he implied that a condition of prolapse existed associated with excessive bleeding from the cavity of the uterus. In the early part of the century removal of the uterus by the vaginal route was almost abandoned in favour of the abdominal route. This change was due to the fact that gynæcologists were becoming surgeons rather than physicians and because in most cases abdominal hysterectomy was the method of choice. Mr. Palmer had had to operate on a number of fat patients possessed of an enlarged uterus, who complained of excessive bleeding and who had a varying degree of prolapse. Abdominal hysterectomy had been performed with great difficulty and had often been followed by a prolonged convalescence. Even then only half the condition had been treated and further operative procedure was demanded for the prolapse. This treatment had appeared very unsatisfactory and the question arose why a vaginal hysterectomy should not be combined with a reconstruction operation. It had been argued that removal of the cervix by hysterectomy lost for the surgeon a stable suture point. But this was surely fallacious because removal of the cervix was claimed to be an important part of the operation for the cure of prolapse. The above considerations had led him to combine the two operations and up to the present time 60 patients had been so treated. Common symptoms associated with the prolapse syndrome were a sense of diminished physical capacity, girdle ache, a sense of prolapse, frequency of micturition, menorrhagia, and excessive leucorrhœa. Before the operation was attempted it was necessary that the uterus and appendages should be mobile, and that the uterus should not be too large or the appendages grossly inflamed, the cervix should come down readily to the vulva and the vaginal outlet be relaxed. The operation consisted in an anterior colporrhaphy, vaginal hysterectomy, reconstruction of the hernia of the pouch of Douglas, posterior colporrhaphy, and perineorrhaphy. The operation, in Mr. Palmer's hands, took about an hour to perform. As a rule there was no appreciable shock. A vaginal discharge often appeared but cleared up readily on douching. Forty-four patients had been examined 12 months or more after operation and the anatomical result was excellent except in one case where there was a slight bulge of the posterior fornix, due to imperfect fixation. There was one death, which occurred in a mentally defective woman who removed her perineal stitches with her fingers; the wound became septic and she died from pulmonary embolism. The remaining 15 patients were seen three months after operation and the results appeared excellent.

A cinematograph film accompanied Mr. Palmer's verbal description.

SECTION OF PÆDIATRICS

After some introductory remarks by the chairman, Dr. F. J. **Poynton** (London), president of the section, Dr. W. G. **Wyllie** (London) opened a discussion on

Encephalitis

using the term to include inflammatory, toxi-degenerative, and vascular cerebral lesions. The subject, he said, was one of recent growth; prior to 1916 it was little known, but it had been developed as the outcome of the appearance of epidemic encephalitis at that time and of meningo-encephalitis in the last 12 years. The disorders which he reviewed fell into three main types: (1) encephalitis lethargica and polio-encephalitis; (2) complications of vaccinia and fevers; and (3) acute encephalomyelitis of spontaneous onset. Of these the first group stood out as distinct entities of known pathology, although polio-encephalitis was decidedly rare. Dr. Wyllie depicted briefly the clinical features of encephalitis lethargica, and drew attention to the decline in its incidence in recent years, and the rarity of acute attacks at the present date. He maintained that cerebral lesions were rarely caused by the polio-virus, and a diagnosis of sporadic polio-encephalitis was likely to be erroneous. The symptoms of this disorder were fever, vomiting, and convulsions of sudden onset; coma; residual hemiplegia, sometimes with mental defect and epilepsy. A syndrome such as this might result from other types of encephalitis, and its nature cannot be determined on clinical evidence. Cases of acute hemiplegia had been habitually attributed to polio-encephalitis since the publication of Strümpell's paper in 1884, though this author had not received unanimous support in regarding them as closely analogous to poliomyelitis.

Passing to the second group, Dr. Wyllie said that these nervous complications had long been recognised as rarities; since 1922 they had become more common and had received intensive study. Various syndromes were met with; a purely meningeal one, with or without convulsions, might arise in connexion with any fever. In addition to this he mentioned: (1) a combined cerebral and spinal type; (2) a mainly spinal type; (3) a cerebellar type; and (4) a focal cerebral hemiplegic type. The first two were most commonly found in association with vaccinia, small-pox, and measles. The third, or less often the second, followed chicken-pox. The fourth was the commonest complication of whooping-cough, scarlet fever, and mumps. Encephalopathies following rubella were rare, and varied in type. It was found that the nervous complications of vaccinia, measles, small-pox, chicken-pox, and rubella had certain features in common—an interval of about a week between the onset of the primary exanthem and the nervous symptoms, and the absence of any relation between their occurrence and the severity of the fever, or the size of the epidemic. Dr. Wyllie discussed the relative frequency of these complications and pointed out that the incidence of all of them was small. The mortality-rate was least (6 per cent.) in varicellar cases, about 10 per cent. in morbillic, and 30–40 per cent. in post-vaccinal. When recovery took place it was usually complete, though some form of paralysis, or disturbance of speech or behaviour might linger for a while. Some permanent incapacity occasionally remained, most often in cases following measles. Hemiplegia might occur at any stage in scarlet fever. In whooping-cough the symptoms were delayed until late in the paroxysmal stage. They took the form of convulsions (pertussis eclampsia), sometimes accompanied by hemiplegia, diplegia, idiocy, and blindness. Most cases, though not all, were fatal. Cerebral complications had followed mumps, but were very rare. They also occurred in other acute infections such as pneumonia, erysipelas, and otitic inflammation.

The secondary encephalopathies could be divided, Dr. Wyllie said, into two main types from the pathological point of view—"acute toxic encephalitis," and demyelinating encephalitis. The features of the first were congestion, œdema, vascular endothelial proliferation, and ganglion cell degeneration. It was almost certainly a reaction to bacterial toxins rather than the result of a microbic invasion. Toxic encephalitis occurred most typically in connexion with whooping-cough and acute infections such as pneumonia. Fairly distinctive changes had been found in fatal cases of pertussis eclampsia, and the endotoxin of pertussis could produce a rapidly fatal meningo-encephalitis in guinea-pigs. An exaggerated importance had been given in the past to vascular lesions as a cause of hemiplegia. Demyelinating encephalitis was characteristic of the encephalomyelitis following vaccinia, measles, small-pox, chicken-pox, and rubella. The origin of the reaction was unknown. In vaccination experimental research had failed to reproduce lesions analogous to the demyelinating encephalomyelitis seen in man.

Turning to spontaneous encephalomyelitis, Dr. Wyllie stated that it included several conditions which presented cerebral, spinal, and meningeal symptoms, combined or separately. One form showed the same demyelinating feature as did the cases following vaccinia and measles. Toxic encephalitis was also represented among them. Cases which had been described as "epidemic serous meningitis" were regarded as a meningeal type of this disorder. The cases described as acute tremor, acute ataxy, and acute hemiplegia were difficult to place; their causation and pathology were obscure, though they might be of toxic origin. The hemiplegias were usually permanent, and often accompanied by amentia and epilepsy. Dr. Wyllie had performed a post-mortem on one such case, and found thrombosis of one anterior cerebral artery.

The cerebro-spinal fluid was fairly uniform in these disorders; it might be normal, or show some rise of protein and cells. The persistence of normal chloride and glucose content was of assistance in excluding tuberculous meningitis. Lumbar puncture was of therapeutic as well as diagnostic value, and should be repeated daily in the acute stage.

Dr. **NEILL HOBHOUSE** (London) thought that in the past a disproportionate amount of attention had been given to the secondary as opposed to the spontaneous form of encephalomyelitis. From his own experience he thought that the secondary form was decidedly rare; the fatalities which it had caused had given rise to the impression that it was commoner than it really was. On the other hand, the spontaneous form was extremely common, but had as yet hardly gained general recognition, partly because the extent to which it simulates other diseases had led to many cases remaining undiagnosed. The symptomatology of the spontaneous form was very varied, and the disease must be recognised more by its course than by its symptoms. He looked upon it as a disease with acute or subacute onset, producing multiple lesions in the afferent, pyramidal, and cerebellar tracts, often breaking the reflex arc, but sparing the lower motor neurone. The course was characterised by shifting lesions, fresh ones developing as earlier ones cleared up, and by the fact that it left no residua behind. He had found that there were two diseases for which it was liable to be mistaken, tuberculous meningitis, and much more commonly poliomyelitis. The normal chloride content of the C.S.F. was the best guide in excluding the first of these. The differential diagnosis between it and mild poliomyelitis might be difficult, but in encephalomyelitis there was some active movement in the muscles, electrical reactions remained normal, and there was no true wasting. Sphincter disturbance was very rare in poliomyelitis, but was a pronounced feature of encephalomyelitis.

Dr. W. H. **BEST** (Bournemouth) raised the question whether any of the factors which predisposed to neurotropic virus infections could be controlled. Treatment was at present ineffective; it was necessary to fall back on general prophylactic measures, and important to determine which of them were likely to be successful. It was probable that the virus of encephalitis entered by the nasopharynx, and it might be neutralised by healthy nasal secretion. Efforts should be made to keep the air-passages as healthy as possible, and to ensure that dormitories were well ventilated and beds adequately spaced when the disease was prevalent. Sources of nervous exhaustion should be reduced to a minimum. He suggested that the virus of vaccinal encephalitis might gain entry through the vaccination lesion, and that the chance of this might be lessened by the application of antiseptic dressings, which diminished the local inflammatory reaction.

Dr. T. R. **HILL** (London) discussed the effects of chronic encephalitis lethargica in children. These appeared in the first instance as two distinct syndromes—parkinsonism and behaviour disorder. The latter was never found in conjunction with bilateral parkinsonism, but mixed and transitional types were seen as the mental disturbance became replaced by the physical one. Various types of dyspituitarism also occurred, and might be associated either with parkinsonism or with behaviour disorder. He looked upon the basis of the behaviour disorder as a primary exaggeration of emotional and instinctive functions, and stressed the fact that it was not accounted for by diminution in intelligence or inhibition. Different primary instincts showed exaggeration in individual cases. The reverse picture was seen in the mental state which accompanied parkinsonism. Here the condition was one of emotional inertia without dementia (bradyphrenia). He was reminded in this connexion of Head's belief in the existence of a basal (thalamic) area which he called the seat of "affective consciousness." Primary emotion was inseparable from primary impulse, and this area must also be associated with instinct. It seemed probable that its functions were disturbed by the encephalitic infection in such a way that they were exaggerated in behaviour disorder and diminished in parkinsonism; possibly a state of irritation from an active virus passing into one of paresis. In conclusion he asked whether certain constitutional mental disturbances in children might not be due to defective function of the same areas as are damaged in encephalitis.

The **President** said that some of his published cases of hemiplegia, to which Dr. Wyllie had referred, were due to congenital syphilis. His experience had coincided with Dr. Hill's in that he had seen post-encephalitic children changing from behaviour disorder to parkinsonism. The diseases which had just been described produced some of the most tragic cases which he had seen among children; he called to mind a healthy boy dying suddenly after vaccination, and a pitiful collection of parkinsonian children shown at a medical meeting. There seemed to him to be a close analogy between the lesions of encephalitis and of chorea, which was best explained as a meningo-encephalitis caused by the rheumatic virus. Tuberculosis, a disease which was often compared with rheumatism, had its counterpart in the lesions of the fatal tuberculous meningo-encephalitis.

Dr. G. M. **Findlay** (London) distinguished three types of virus: (1) a strictly neurotropic, (2) one which can be rendered neurotropic, and after a certain number of passages became fixed for nervous tissues—e.g., yellow fever—and (3) one which was never neurotropic. There was a group of diseases characterised by demyelinisation occurring after virus infections, but no *known* virus is capable of producing demyelinisation. A number of diseases pathogenic to animals had lately been shown to be capable of affecting man—e.g., louping ill; it was possible that some virus diseases not previously recognised had also done so.

Dr. A. A. **Moncrieff** (London) referred to cases of encephalomyelitis which were in a state of acute mania at the onset, and to others which began in status epilepticus. He agreed that there was complete recovery without residua. He had formed the impression that there was a non-rheumatic type of recurrent chorea, and it was possible that it was a form of encephalitis; its recurrent nature, however, did not suggest a virus infection.

Dr. H. **Chodak Gregory** (London) thought that the prognosis from the mental point of view in encephalomyelitis presented difficulties. She had seen deterioration both in behaviour and in intellect which seemed to have followed this disease.

Dr. J. **Graham Forbes** (London) said it was often difficult and sometimes impossible to distinguish tuberculous meningitis from encephalomyelitis by examination of the cerebro-spinal fluid.

Dr. B. E. **Schlesinger** (London) thought it unlikely that the virus entered through the site of vaccinia, since encephalomyelitis had followed intradermal vaccination. He suggested that a rigid insistence on vaccination was somewhat out of date, and deprecated exclusion of all unvaccinated children from convalescent homes. In view of the mortality statistics of recent years it would really be more practical to insist on diphtheria immunisation.

Dr. R. D. **Clarkson** (Larbert) described a dramatic case of recurrent chorea which subsequently developed parkinsonism. With regard to Dr. Hill's observations, he thought that many children with behaviour disorder continued their performances throughout the development of parkinsonism as long as their muscles would serve them. Some of these performances were very fantastic, and the primary instinct concerned was not easily determined.

HOUSING IN SCOTLAND

(FROM OUR EDINBURGH CORRESPONDENT)

A reaction towards the high tenement is now noticeable in Scotland, although students of the housing movements know that the tenement has been one of the great incubuses on Scottish housing development. But now it is being said that the numbers of houses needed in growing localities cannot be provided at 12 or 16 or 24 houses per acre without using more land and money than the cities can afford. That overcrowding exists is now recognised, but the suburban outbursts are not enough to relieve it and the expense is too great. The new tenements are to be built with lifts and other common-sense amenities, and they are to be let at rents suited to the mass of wage-earners. Surely the memories of builders and municipalities must have become shorter than usual. The main problem to-day is a reasonable and *low* enough rent. But the new type of tenement is not likely to bring that any nearer. Meanwhile it is encouraging to record that, in Scotland, about 180,000 houses have been built (by local authorities or subsidised private enterprise, and so forth) since 1919. If we include housing schemes under construction or already planned, the number would be considerably increased and the non-subsidised houses now run into many thousands. Naturally the tenement owners are becoming alarmed at the pilgrimage to the new suburbs, which is favoured by the increase of bus transport. In Edinburgh alone, small cottages or bungalows are appearing by the score all round the city. Every week sees a difference and there is no sign of failure in the activity of the speculative builders. Criticism of form and structure is common, but not as a rule well-grounded.

The cry for removal of slums goes on; but, in Scotland at least, the compound Act which requires removal of slum and simultaneous provision of houses is every day gaining in favour with the local authorities. They are now coming to believe in the new unit grant, which is no longer a flat rate per house, but a grant proportional to the number of persons rehoused. This has resulted in a steady increase in three- and four-roomed houses, which cost the local authority only slightly more than two-roomed houses.

Sir Hilton Young's new Bill, it has lately been announced, is to start from a new datum line—namely, the reduction of overcrowding. This, of course, is the aim of all the schemes. But it will be interesting to see whether it will be possible to achieve this with the money that is available. So far the new proposals—building societies—do not seem to be getting under weigh. At the time of the report of the Scottish Royal Commission in 1917 the only course possible was to put an obligation on the local authority to build. The new scheme will put an obligation on the local authority to build up to a required standard. The idea deserves success, but it will be neither cheap nor easy to carry it out. Incidentally there is a growing need for a middle-period census, which, I believe, is now possible under the statute.

In a recent lecture the Edinburgh Lord Dean of Guild recalled a remark made in his youth regarding the large number of tenements then being erected—"we are just re-building the slums in the suburbs." He sometimes heard the same remark to-day. But it was emphatically not true that we were to-day rebuilding the slums in the suburbs. Drab in appearance many of the new tenements might be, sadly lacking in the invaluable uplift that even a little bright colour would give them. But in the planning of the houses themselves, in sanitary requirements and equipment, in such little things as the keeping of tubs and sinks out of living rooms, in the provision of a small larder where foodstuffs might be kept in fit condition for human consumption, and particularly in the arrangement of the windows so as to catch the sun and ensure adequate ventilation they were incomparably superior, not only to the slums of the past, but to a very large number of the houses of yesterday occupied by the great mass of the people of Scotland—*Experto crede.*

MEDICINE AND THE LAW

A Televisionary Consultation

CAN any practitioner with a Harley-street address recall having been consulted by Mr. Henry John Trimnel, of Cardiff, as to the treatment of a diabetic patient named George William Haken? At the inquest on Haken last week Mr. Trimnel, a homœopathic herbalist, admitted that he had assured the patient's parents that he was obtaining a second opinion about the case from a Harley-street specialist. The parents told the coroner they thought this meant a physical communication by word of mouth or by letter. Mr. Trimnel explained that he conducted the consultation by prayer and meditation. Another esoteric feature of Mr. Trimnel's technique was his use of a "pathometer" for the purpose of homœopathic diagnosis. He described the instrument as built up on the plan of a short-wave wireless set. A specimen saliva paper was placed in the slot of the machine, Mr. Trimnel manipulated a dial and the instrument gave the answer. Not that it is necessary, according to Mr. Trimnel, for a homœopathic practitioner to make a correct diagnosis; diseases, he said, are often cured by homœopathy without the practitioner being aware of their existence.

Dr. G. F. Petty, assistant house physician at Cardiff Infirmary, gave evidence that Haken first consulted him for diabetes about five months ago. He did not see him again till August 1st, when he went to the patient's home in response to an urgent summons and found him in a state of diabetic coma. He was told by the parents that Haken had suffered from diabetes for about six years, and during the past four months had been treated by "Dr." Trimnel, who had cut down his insulin injections and during the last month had stopped them altogether. Dr. Petty resumed the insulin injections, but the patient died that day. The diet had contained sweet and starchy foods; the effect on a diabetic subject deprived of insulin would be to make him worse. Asked by the coroner if he approved of Trimnel's treatment, Dr. Petty said he did not; if the patient had received insulin treatment and a proper diet it was unlikely that he would have died when he did. Mr. S. Dixon, the Cardiff public analyst, said that three boxes of pills taken from Haken's home contained merely cane sugar; a bottle of medicine supplied to Haken by Trimnel contained a solution of alcohol. Dr. J. Gough, lecturer in pathology at the Welsh National School of Medicine, said that a post-mortem examination showed no trace of the diseases which Mr. Trimnel said his pathometer registered. Dr. Gough was questioned as to the report of the committee which, under the presidency of Lord Horder, investigated the "Abrams box" in 1924. The committee, he replied, described the method as scientifically unsound and ethically unjustified in the treatment and diagnosis of disease. It may be recalled that an instrument described as an improved form of "Abrams box" figured in the prosecution of Mr. C. C. Abbott last year. Reference to the report of the Horder committee was made in discussing that prosecution at the time (see THE LANCET, 1933, i., 766). Mr. Abbott, a "physio-medical practitioner" who used the instrument, was acquitted on a charge of negligence arising from the death of one of his patients. There was, of course, nothing unlawful in the use of the box if Mr. Abbott honestly believed in its virtue. In Mr. Trimnel's case the coroner's jury did not get as far as a verdict of criminal negligence.

The coroner was careful to make it plain that there was no suggestion of illegality in the practice of homœopathy or herbalism. The vital question for the jury, he very properly explained, was whether Trimnel discharged his duty and responsibility to Haken, irrespective of whether he was qualified or unqualified. The jury found that Haken's death was due to natural causes, that Trimnel had discharged his duty to him but had shown negligence, though not wilful negligence. The coroner pointed out that the verdict was inconsistent—a man could not be negligent and yet discharge his duty. The jury retired and finally returned the verdict that Trimnel was negligent but not wilfully so; "although such negligence as he showed accelerated death, it did not amount to gross negligence." Presumably they considered that Mr. Trimnel had an honest belief in his pathometer. As regards his televisionary communication with Harley-street, they censured his statement to the patient's parents as "most improper and"—a cryptic epithet—"uncalled for."

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 1ST, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2097; diphtheria, 1099; enteric fever, 30; acute pneumonia (primary or influenzal), 378; puerperal fever, 48; puerperal pyrexia, 92; cerebrospinal fever, 15; acute poliomyelitis, 18; acute polio-encephalitis, 3; encephalitis lethargica, 7; dysentery, 9; ophthalmia neonatorum, 81. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Sept. 10th–11th was as follows: Small-pox, 0; scarlet fever, 1234; diphtheria, 1451; measles, 329; whooping-cough, 274; puerperal fever, 22 mothers (plus 9 babies); encephalitis lethargica, 270; poliomyelitis, 6; "other diseases," 249. At St. Margaret's Hospital there were 18 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 12 (0) from measles, 5 (1) from scarlet fever, 13 (2) from whooping-cough, 28 (7) from diphtheria, 44 (10) from diarrhœa and enteritis under two years, and 11 (2) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the only death from enteric fever outside London. Fatal cases of diphtheria occurred at Liverpool 4, Leeds 3, Dagenham and Bootle each 2. Liverpool, Newcastle-on-Tyne, and Birmingham each reported 4 deaths from diarrhœa; no other great town more than 2.

The number of stillbirths notified during the week was 280 (corresponding to a rate of 45 per 1000 total births), including 41 in London.

CORRESPONDENCE

THE TEST-MEAL IN THE DIAGNOSIS OF GASTRIC DISEASE

To the Editor of THE LANCET

SIR,—Although Dr. Maclagan's most interesting paper (Sept. 1st, p. 471) provokes this letter it is not my purpose to offer any criticisms on the conclusions to which he has come; they are, indeed, pretty much what I should have expected. But as I think that a good many people may draw the conclusion that the histamine test is in general a more useful proceeding than the ordinary fractional meal, I would like to point out that this by no means follows even if we accept all Dr. Maclagan's conclusions.

In applying the results of laboratory investigations to clinical work we may proceed in two quite different ways. First, we may use them as penny-in-the-slot aids to diagnosis; this method, although frequently spoken of in slighting terms, is perfectly legitimate and is in daily use—e.g., in Wassermann tests. In earlier days it was used in dealing with the results of the Ewald meal in the diagnosis of gastric ulcer and carcinoma, though no one even then credited it with the degree of accuracy that is essential for the really successful application of this method. As experience accumulated it was largely discarded; but with the advent of the fractional meal it came into favour again and attempts were made to establish various types of curve as diagnostic of different gastric diseases. Again further knowledge has shown that these attempts were not justified.

This method demands that statistical analysis should show high accuracy, but it does not demand any knowledge of the pathological basis on which the test rests, and in some at least we have no such knowledge.

The other method of dealing with laboratory investigations proceeds on very different lines. Here we note the facts that the laboratory gives us just as we note the facts that our fingers and ears give us in percussing a chest, and we use them in exactly the same way, trying to fit them all into a comprehensible pathological picture and on that to base our conception of the disease. The successful application of this method demands an accurate knowledge of the pathological basis of the test.

Dr. Maclagan's observations are concerned entirely with the first method; it remains to be considered whether we cannot get more information by using the second. I think we can, but only if we interpret our curves in the light of all the available facts. A "peak" or a "plateau" curve, for example, may be produced in several different ways, just as an alteration in the percussion note in the chest may be the result of quite distinct lesions, and you can no more diagnose definite gastric disease by noting simply an alteration in the shape of the curve than you can diagnose the nature of the pulmonary disease by the mere presence of a dull patch. For our purpose here there can be no doubt that a fractional meal gives much more useful information than an estimation of the histamine secretion.

I am not going to discuss the merits of the various hypotheses that have been put forward to explain the mechanism of the fractional curve; I will only say that if fractional meals are to be interpreted in this way this mechanism is not, as many seem to think, merely a matter of academic interest but is of immediate clinical importance. Dr. Maclagan, as the result of a very careful statistical inquiry, has discarded duodenal regurgitation as a factor of no importance. I am glad that I do not find his argument conclusive, for by accepting the pylorus as an important controlling factor I do get considerable help from test-meals.

I am, Sir, yours faithfully,

G. W. GOODHART.

West Cromwell-road, S.W., Sept. 8th.

RADIOLOGY IN GENERAL PRACTICE

To the Editor of THE LANCET

SIR,—From your report last week (p. 565) of the B.M.A. discussion on Radiology as an Aid to the General Practitioner it seems that one speaker made the following statement without challenge: "The general practitioner who purchased an X ray outfit was likely to become a menace to his patients." Having found myself handicapped by the want of X ray facilities, I have for more than two years owned an X ray apparatus and used it in the ordinary routine of my practice; and still do not regard myself as other than a practitioner of general medicine. I do therefore challenge most heartily the statement quoted, and would rather suggest that before long X ray apparatus will be regarded as an indispensable part of the equipment of a conscientious practitioner. In my experience it is desirable to have an X ray film under view during the setting of any fracture. Much pain is avoided if radiography can be arranged to obviate delay in treatment; the result too is very much better after immediate reduction and setting than if the patient must spend time in travelling to and from a radiologist.

The following three instances, occurring in ordinary routine, may enforce my argument:—

An old lady of 86 was moved carefully into bed after a severe fall in her own home. The following morning a photograph, taken with the minimum of disturbance by a portable apparatus, showed a paratrochanteric fracture of the femur. This picture facilitated immediate treatment, and greatly assisted in the production of the perfect anatomical and functional result which was obtained.

A patient who was giving himself injections of insulin broke a hypodermic needle in his arm. An X ray photograph, with indicators at the point of entry, showed a considerable length of needle deeply placed. This was removed under local anæsthesia, having wet plates under view. The needle had already travelled since introduction and its removal presented difficulty, which would have been increased still further by delay.

A woman, seven months pregnant, was found clinically to have a persistent transverse lie of the fœtus. Having confirmed this by X ray examination, version was performed without moving her from the couch, and she saw a film showing the vertex presenting before returning home.

Is it not possible that the time has come for the recognition of the advantage to patients of routine radiography, as required in the practice of general medicine, without any sort of displacement of the consulting radiologist? Surely as a result his scope would expand. Certainly more would be expected of him.

I am, Sir, yours faithfully,

W. B. R. MONTEITH.

Bourne, Lincs, Sept. 8th.

THE EDINBURGH PREGNANCY DIAGNOSIS STATION

To the Editor of THE LANCET

SIR,—From a letter sent out as from the Pregnancy Diagnosis Station here to those medical practitioners whom it has served in the past it would appear that the station is closing down in Edinburgh and is reopening in London.

Actually this is not so. It is the case that, to my great regret, Dr. Wiesner, to whom is due all the credit for the inception and successful development of the station, is leaving this Institute and is moving to London where he intends to continue his diagnostic and advisory work. But during the past five years the station has become a necessity to many practitioners and accordingly will not be closed. At least it must continue to serve Edinburgh and the East of Scotland and to do this it must serve a much wider area, for its efficiency must be largely determined by its size and this must depend on the number of clients. To ensure efficient running, prompt reliable service, and low charges several thousands of tests must be made annually. Its income must be sufficient to provide skilled medical supervision, an efficient technical staff, smooth routine, and above all sufficient data, for only then can the records possess any considerable scientific value. I have to hope therefore that this laboratory will be used by practitioners from all parts of Great Britain.

If the facts were better understood there would of course be room for more diagnostic laboratories than at present exist. It is irritating to recognise that even yet so many practitioners either do not know that there is such a service in most of the larger cities or, knowing, take no advantage of its existence. It should not be necessary to keep repeating that the tests now used yield an accuracy of not less 97 per cent.; that pregnancy can be recognised as early as 10–14 days after conception; that the report on any given specimen can be despatched after 24 hours, 48 hours, or 5 days according to the particular test made, and that all that is required is 50 c.cm. of morning urine.

The interest of this work is not commercial, it is to be found in the unusual and the exceptional; for in these cases is the seed of knowledge which being disclosed will contribute largely to the endocrine therapy of the immediate future.

I am, Sir, yours faithfully,

F. A. E. CREW.

Institute of Animal Genetics, Edinburgh, Sept. 8th.

THE WORLD WE LIVE IN

To the Editor of THE LANCET

SIR,—Your leading article in to-day's issue on Sir James Jeans's address to the British Association ends with a paragraph that appears somewhat confused. You state that no naturalist could believe the proposition that man's control over nature has outstripped his moral control over himself. This proposition you derive from the presidential address at the York meeting of the Association in 1932 when Sir Alfred Ewing stated his belief that man was *ethically* unprepared for so great a bounty as had been conferred upon him by modern engineering science. He added that this bounty in the hands of knaves or fools might easily wreck our civilisation, but he ended the theme with a declaration that he could not think that man was destined to atrophy through cultivating one of his most God-like faculties—the creative ingenuity of the engineer.

To me Sir Alfred's address conveyed an impression wholly opposite to that which it seems to have created in your mind, Sir. His view can hardly be styled a "gloomy misconception" nor does it appear to be inconsistent with "the plain experiences of life." Science is being prostituted all over the world in the service of sectional interests and in order to forward motives hostile to human welfare. The "knaves or fools" have the whip-hand in many places and they constitute a very real danger to civilisation. How comes it that "no naturalist could believe that"?

If your concluding paragraph refers to some technical point in philosophy then I must ask you to allow me to withdraw this criticism; but if, on the other hand, it refers to the "plain experiences of life" then I feel sure you must have mis-read Sir Alfred Ewing or else hold a view of certain modern tendencies which appears to me wholly opposed to the weight of the evidence.

I am, Sir, yours faithfully,

LEONARD P. LOCKHART, M.D.

Beeston, Notts, Sept. 8th.

*** We take the opportunity of regretting the misprint of Yale for York as the locus of Sir (James) Alfred Ewing's address two years ago.—ED. L.

HYPEREMESIS GRAVIDARUM

To the Editor of THE LANCET

SIR,—In support of Dr. Hurst's view that there is an important functional element in the vomiting of pregnancy, it would perhaps be of interest to quote two cases.

1. A husband asked me to see his wife in the country. She had lost her first baby from hyperemesis gravidarum; she was pregnant for the second time and seemed likely to do the same as she was vomiting repeatedly. I saw her and explained things to her that evening and again next morning. Her vomiting ceased and she carried her child to term.

2. A patient of mine went abroad, being pregnant at the time. At three months she was vomiting practically everything and was subsisting (if I remember rightly) on sponge-cake. She was so ill that she returned to England. I saw her and explained to her the presence of an hysterical element in her vomiting, told her to get up and have a good square meal at the Berkeley with a cheery companion She went with her husband and her vomiting ceased.

I am, Sir, yours faithfully,

Park-square West, N.W., Sept. 5th. C. H. RIPMAN.

JOHN KNIGHT, SERJEANT SURGEON

To the Editor of THE LANCET

SIR,—In addition to the interesting account of Mr. Serjeant Surgeon Knight given in your annotation last week, the following extracts from the Calendar of State Papers quoted by Morgan Richards in his "Chronology of Medicine" may be useful to "E. M. C."

1661, July 11th. Grant to Richard Pile, of the office of first Principal Surgeon to the King and of first Serjeant Surgeon; and similar grants to John Knight and Hum. Painter, with annuities of £150 each.

1661, March (? 1662 historical year). Petition of John Knight, Serjeant Surgeon to the King. Having served his Majesty abroad was continued with others in their respective places on the Restoration, received the usual fee belonging to his office for embalming the Duke of

Gloucester, being the only profit that has fallen to him, but is now ordered to divide it with Richard Wiseman, Surgeon in Ordinary. Begs not to be made the only person who has had his fee taken from him. Grant to John Knight of the office of Principal Surgeon: fee £26. 6. 8 with the like pension of £150.

1662, September. Petition repeated in the same words as those used in March.

1662, Sept. 11th. Warrant to Mr. Knight to retain the whole usual fee which he received for embalming the late Duke of Gloster, which has been disputed for by some other of the King's Surgeons.

I am, Sir, yours faithfully,

Cavendish-place, W., Sept. 10th. CECIL WALL.

VACCINES IN PEPTIC ULCER.—Dr. J. N. Gale writes: "In my letter last week I inadvertently omitted the source of the vaccine used in the treatment of peptic ulcers. It is sold by Parke, Davis & Co., under the name of *Intestinal Streptococcus Vaccine*, and I used carbolised saline as a diluent."

OPENING OF THE MEDICAL SCHOOLS

IN connexion with the opening of the session at the London medical schools the following arrangements have been made:—

Charing Cross Hospital

The opening of the school will be celebrated at the inauguration of the centenary year. Details of the arrangements will be published later.

Guy's Hospital

On Tuesday, Oct. 2nd, at 2.45 P.M., the prizes will be distributed by Lord Nuffield. Mr. C. H. Fagge will deliver the inaugural address.

King's College Hospital

On Saturday, Sept. 29th, from noon to 6 P.M., and on Sunday morning, there will be lectures and demonstrations open to all practitioners. Post-graduate lectures will also be delivered in the lecture theatre of the medical school on Thursdays at 9 P.M. from Oct. 11th onwards. The annual dinner of past and present students will be held on Sept. 29th, at 8 P.M., at the Connaught Rooms, Great Queen-street, W.C., Dr. Wilfrid Attenborough presiding.

London Hospital

A post-graduate course for former students of the hospital will be held from Oct. 17th to 20th. The old students' dinner will be held on Thursday, Oct. 18th, at 7.30 P.M., at the Trocadero Restaurant, with Dr. James Thomas in the chair.

Middlesex Hospital

The hundredth winter session will be opened in the Queen's Hall, W., on Monday, Oct. 1st, at 3 P.M., when Dr. Henry MacCormac will deliver an introductory address, entitled Our Profession, and Sir Farquhar Buzzard will present the prizes. A post-graduate course for former students of the hospital will be held from Sept. 28th to Oct. 1st. On Oct. 1st the annual dinner will be held at the Savoy Hotel at 7.30 P.M.

Royal Free Hospital

On Monday, Oct. 1st, at 3 P.M., Dr. M. H. MacKeith, dean of the British Post-Graduate Medical School, will deliver an opening address on the Institutes of Medicine, and will afterwards distribute the prizes. Miss Elizabeth Bolton will be in the chair. The annual dinner will be rsday, *Dec. 6th, also at the Savoy.*

mew's Hospital

5th, an appeal banquet will be held at the ouse in connexion with the medical college funds for the purchase of the Charterhouse site.

St. George's Hospital

Sir Humphry Rolleston will preside at the prize distribution on Monday, Oct. 1st, at 3 P.M., when Prof. Langdon Brown will deliver an address entitled We Have Reason to Think. A post-graduate course for former students of the hospital is being held from Sept. 28th to Oct. 1st, and the annual dinner will take place on Saturday, Sept. 29th, at 7.45 P.M., at Claridge's Hotel, with Mr. W. Fedde Fedden in the chair.

St. Mary's Hospital

A week-end post-graduate course, open to all medical practitioners without fee, will be held from Sept. 28th to 30th. The annual dinner of past and present students will take place in the new medical school library on Saturday, Sept. 29th, at 7.30 P.M., when Dr. P. Montague Smith will be in the chair.

St. Thomas's Hospital

A post-graduate course for former students will be held *between Sept. 24th and 28th. Dr. W. L. Wainwright* will preside at the old students' dinner which will take place at the Dorchester Hotel, at 7.45 P.M., on Sept. 28th.

University College Hospital

On Monday, Oct. 1st, at 3.15 P.M., in the library of the medical school, Sir John Rose Bradford, F.R.S., will deliver the opening address. The annual demonstrations for old students will take place on Oct. 11th and 12th, *and the annual dinner will be held in the library of the* medical school on Oct. 12th, at 7.30 P.M., with Sir John Parsons, F.R.S., in the chair.

Westminster Hospital

On Monday, Oct. 1st, at 3.30 P.M., the winter session will open at the Central Hall, Westminster, when Sir John Simon will deliver the inaugural address. A short course for former students of the hospital will be given on Saturday and Sunday (Sept. 29th and 30th), and the annual dinner of past and present students will take place at the Trocadero Restaurant, on Saturday, Sept. 29th, at 7.45 P.M.

Royal Dental Hospital

Prizes will be distributed at the hospital on Friday, Oct. 5th, at 8 P.M., at a conversazione at which Prof. William Wright will preside. The annual clinical At Home will be held at the hospital on Nov. 24th, and the dinner of past and present students will take place on the same evening at the Trocadero Restaurant, at 7.30 P.M., when Mr. J. Thornton Carter will be in the chair.

Further details of post-graduate courses will appear in due course in our Medical Diary.

MEDICAL NEWS

University of Cambridge

Dr. A. B. Appleton is resigning his appointment as lecturer in anatomy on going to *St. Thomas's Hospital as professor of anatomy in the University of London.* Among university teaching officers who vacate their offices on Sept. 30th, on reaching the limit of tenure, are Mr. V. C. Pennell, F.R.C.S., and Dr. D. G. Reid, university demonstrators in anatomy.

University of London Medical Graduates Society

The next extra-metropolitan dinner will be held at Queen's College, Cambridge, on Friday, Sept. 28th, at 7.30 P.M. Members should apply for tickets to the hon. secretaries at 11, Chandos-street, London, W.1.

Central London Throat, Nose, and *Ear Hospital*

From Oct. 1st to 27th an intensive post-graduate course in laryngology, rhinology, and otology will be held at this hospital. On Dec. 1st and 2nd a general week-end course has been arranged, and from Dec. 3rd–8th there will be a course in methods of examination and diagnosis. The annual address will be given at 4 P.M. on *Friday,* Oct. 12th, by Mr. Douglas Harmer, consulting surgeon to the throat department at St. Bartholomew's Hospital, who will *speak on treatment of malignant disease in the* upper jaw.

ADDRESSES AND ORIGINAL ARTICLES

THE USE OF THE DIATHERMY KNIFE IN MALIGNANT DISEASE OF THE MOUTH, NOSE, AND PHARYNX

WITH AN ANALYSIS OF 109 CASES

BY NORMAN PATTERSON, M.B. Edin., F.R.C.S. Eng.
SURGEON TO THE THROAT, NOSE, AND EAR DEPARTMENT, LONDON HOSPITAL

THERE is nothing novel in the employment of heat for the destruction of tumours. The "fire drill" was used in Egypt for the cauterisation of fleshy tumours of the chest (vide Edwin Smith Surgical Papyrus, dated 1600 B.C. but probably compiled a thousand years earlier) (Breasted). Hippocrates (400 B.C.) states "The man who had a carcinoma in the throat cauterised was cured by us."

Celsus (A.D. 50) recommends cauterisation in the treatment of cancer "attacking the ulcers of the mouth." Galen (A.D. 131) also advised cauterisation as a remedy for such ulcers. Albucasis (936–1013) was a strong supporter of the cautery and describes its successful use in a large tumour of the mouth. It is interesting to note that he opposes applications of the cautery to the centre of the cancer as it causes ulceration, but he advises its employment in a circular manner round the growth. Guy de Chauliac, of Montpellier (1300–68), advocated the actual cautery in cancer of the lips. Marchettis, of Padua (1664), excised with the scalpel and cauterised a fleshy tumour of the floor of the mouth.

Wiseman, of London (1676), advocated the use of the button cautery for the arrest of hæmorrhage. He appears to have used the cautery to good effect in a female, aged 40, suffering from a cancer of the lower jaw, and in another case of the same disease affecting the upper jaw and palate. The latter patient was apparently cauterised almost daily till in five weeks a scar formed which did not break down during the succeeding seven years. Dr. Turner, of London, in 1722 mentions the use of the cautery, but advises palliative measures only for cases of cancer of the mouth. Benjamin Bell, of Edinburgh (1786), used twisted wire sutures in excising carcinoma of the cheek or tongue and the cautery for the arrest of hæmorrhage.

Development and Technique of Electrical Methods

In 1850 John Marshall removed various tumours with the aid of the electric cautery. Middledorpff in 1855 advocated the use of the electric cautery in such operations as removal of a cancer of the tongue where hæmorrhage was likely to be severe.

By diathermy is meant the passage through the body of a high-frequency current which generates heat in the tissues. Nikola Tesla, in 1891, first suggested its use in medicine.

In 1896 Oudin described a method of destroying benign tumours by sparks from a d'Arsonval generator, a method which became known as "fulguration." It was used by Rivière for the destruction of malignant tumours, and by F. H. Cook, of New York, from 1904 onwards, in conjunction with X rays, for a similar purpose. In 1906 de Keating-Hart, of Marseilles, referred to the use of diathermy in cancers. In England Philip Turner described 20 cases of carcinoma treated by fulguration and diathermy from 1909–12. These included 7 cases of carcinoma of the tongue and mouth. All died of metastatic growths, but there was only one local recurrence.

Nagelschmidt recommended the use of diathermy for arthritis in 1907, and in 1919 demonstrated its employment for the coagulation of tissues. He visited St. Bartholomew's Hospital on Oct. 21st, 1919, and treated three cases, one a post-nasal growth. Harmer and Cumberbatch adopted the method. In the meantime Czerny (1910) introduced a method which he called the "arc operation," the instrument being referred to by Howard Kelly as the "acusector." Another pioneer of diathermy was W. L. Clark, of Philadelphia, who began to employ it in 1909.

Surgical diathermy and endothermy are now extensively used in various parts of the body, mainly, but not entirely, in the treatment of malignant neoplasms. Lambert Lack used diathermy for the first time at the London Hospital for a case of carcinoma of the soft palate in 1913. At this time I had the privilege of being his assistant. So far as I can ascertain I was the first to employ diathermy in carrying out a set excision, and since then I have used this method whenever possible. One of its great advantages over the original procedure of piecemeal destruction of the tumour with a button electrode is that definite surgical removal is accomplished by cutting through the surrounding healthy tissues, the diseased area being left undisturbed. Another advantage—though it does not affect the result of the operation—is the obtaining of an excellent specimen for examination by the pathologist. The excision is always supplemented by a thorough application of the button electrode to the cavity left after the removal of the tumour.

The current used in diathermy is of very high frequency (500,000 to 1,000,000 per second); Wyeth, indeed, uses a frequency of 5,000,000 per second. When a good modern apparatus is available the electrode may take the form of a small knife or needle. A terminal of this form is the most suitable kind of electrode for cutting out the required amount of tissue. Sometimes it is useful to have the knife or needle set at an angle to the shaft. The same remark applies to the button used in treatment of the cavity. The amount of blood circulating in the immediate vicinity determines to some extent the depth to which heat generated around the electrode penetrates. The tissues can to some extent be devascularised by pressure, as with the button terminal, or by ligation of the main vessel or vessels supplying the part. Devascularisation by ligature has the further advantage that sloughing extends to a greater depth ensuring more complete destruction of the tumour and minimising the risk of hæmorrhage. In employing diathermy the fluids in the tissues should be raised to boiling point, but desiccation and sparking should not be allowed to occur. To counteract this the electrode can, by the application of a little more pressure, be advanced into a fresh area or buried more deeply. Reduction of current, scraping dead material from the electrode, or the application of normal saline to the wound may be necessary. No fresh application to the tissues should be made when the current is running, and the current should be stopped before removal of the instrument. Steam issuing from the field of operation interferes with vision; it can be blown or sucked away by employin a suitable apparatus.

Before operation the same attention should be to the teeth as if ordinary cutting instruments to be used. This means that in most cases all must be extracted from two to three weeks pr the employment of diathermy. In some cas thorough investigation of the patient by a physi is necessary before operation. It is always advisa to have a Wassermann reaction carried out, but t surgeon must not be influenced by a positive result if the clinical picture is one of carcinoma.

The anæsthetic employed must be non-inflammable.

The points to be attended to in using the excision method of diathermy are the following:

(1) When applying traction, as in removal of a portion of the tongue, it must be remembered that the growth and its surroundings are elongated, and this may lead to the removal of too much tissue in one direction and too little in another. This can be avoided by marking out with the diathermy electrode the exact area to be removed before the parts are subjected to tension.

(2) The section should be made when possible at a distance of from ½ to ¾ of an inch from the margin of the growth.

(3) The electrode should always be made to cut at right angles to the surface, and on no account be allowed to slope inwards towards the tumour.

(4) Care must be exercised in nearing the site of an artery such as the lingual; it can generally be isolated and ligatured or obliterated by the use of the diathermy button.

(5) Sometimes the growth is of the diffuse or infiltrating type with no surface ulceration, and its margin may be very difficult to define. In such a case transection with the diathermy knife may be the best means of ascertaining the exact extent of the tumour.

In most of the regions under consideration the tissues around and deep to the growth consist mainly of muscles, and, when cutting through these, the surgeon has no difficulty in recognising the tumour should he by mischance cut into it. On rare occasions when excision cannot be accomplished and it is decided to destroy the tumour piecemeal with the button electrode, it is best to commence the application around the growth and gradually work towards its centre. When coagulation has been carried to some depth the dead material can be removed with a spoon or forceps and the process repeated at a deeper level. Layer after layer can in this way be destroyed.

The main advantages of diathermy over ordinary cutting instruments are briefly these: avoidance of cell implantation; little or no hæmorrhage during the operation and therefore a clear field to work in; destruction of tissues beyond the actual site of section; and sterilisation of the wound. Access to the growth is more often possible by the normal channels, and this avoids the necessity for such procedures as splitting or removing portions of the mandible. It follows from this that the growth can generally be attacked from its surface of origin. A second or even a third operation may be undertaken for recurrences. Bone which has become invaded by growth or which is in dangerous proximity to the tumour can be destroyed.

After operation the mouth, pharynx, or nose should be frequently cleansed with some mild antiseptic lotion. The food must be soft and nourishing. Sometimes the patient will have to be fed for a time through a nasal tube. It is best not to interfere with sloughs until they are quite loose; they usually do not begin to separate till the seventh day or later. Bony sequestra may take months or even years to separate. Secondary hæmorrhage is rare if scrupulous attention be paid to the removal of sepsis from the mouth before operation and if the main vessel of supply be ligatured. Hæmorrhage is more liable to occur after the treatment of an extensive growth. Pressure will generally control hæmorrhage, but bleeding points may require ligature, or the main vessel supplying the part, if not previously tied, may have to be secured. It might possibly be necessary to ligate the external carotid on the opposite side. When this is required, either before or (rarely) after diathermy, I have on several occasions carried out the following procedure which obviates the disadvantages of the classical operation described in the text-books (Patterson, 1930):

> The skin incision is the same as that employed in the classical operation. The deep fascia is incised slightly posterior to the anterior border of the sternomastoid and carefully separated from the under surface of that muscle. The muscle is now retracted and the carotid sheath is exposed on its outer aspect. A longitudinal incision is now made through the fascia covering the internal jugular vein which is freed from its fascial covering for a distance of from 2 to 3 inches. As a rule there are no tributaries entering from behind, and it is a comparatively easy matter to retract the vein medially and at the same time slightly elevate it from the underlying arteries. The vagus nerve must not be disturbed, and care should be taken not to injure the hypoglossal nerve or its branches. In this way the external carotid is brought into view by approaching it from the outside instead of from the inside of the internal jugular. The technique of the actual ligature of the external carotid does not in any way differ from that usually employed. It is very important, of course, not to apply the ligature until the superior thyroid and lingual arteries have been clearly defined. Sometimes it is advisable to tie the ascending pharyngeal artery.

As a temporary measure, compression of the common carotid against Chassaignac's tubercle may be tried.

Growths of the larynx, with the possible exception of a small carcinoma affecting the tip of the epiglottis, are unsuitable for diathermy. Tumours affecting the piriform fossa or the retrocricoid region are quite unsuitable for this form of treatment. In applying diathermy to a carcinoma of the posterior pharyngeal wall care must be taken not to cause necrosis of the cervical vertebræ. Carcinoma of the nasopharynx is a very hopeless disease from the point of view of surgical treatment, but if a growth were diagnosed very early it might be worth treating it with diathermy.

A Series of Cases

The following observations are based on 109 consecutive cases of malignant disease treated with diathermy before 1929—that is, over five years ago. I have subdivided them into groups, which will be considered separately:

	Cases.
Tonsil, soft palate, and faucial pillars	51
Tongue and floor of mouth	31
Lower alveolus	3
Buccal mucosa of cheek	6
Hard palate, upper alveolus, and maxillary antrum	8
Miscellaneous (nose, post-nasal space, and posterior oropharyngeal wall)	10
Total	109

The Tonsil, Faucial Pillars, and Soft Palate

It is convenient to consider tumours of this region under the above heading although the tongue is frequently, and the alveolus occasionally, involved in the growth. In an advanced case all these regions may be invaded, and it is often quite impossible to ascertain the exact site of origin. A tumour arising near the centre of the tonsillar mucous membrane, on the uvula, or close to the middle line of the soft palate may, even when it has reached a considerable size, still be classified as a tonsillar or palatine growth.

Diagnosis as a rule presents little difficulty, but it is astonishing how often carcinoma is mistaken for syphilis—syphilis practically never for carcinoma. It must be remembered that malignant disease may start on the posterior aspect of the soft palate, or starting at the edge of the palate it may extend upwards, involving mainly the posterior surface of the velum. In such a case ordinary inspection, unaided by examination with the post-nasal mirror or by palpation, may give rise to an entirely erroneous impression as to the situation and extent of the tumour. A carcinoma arising in the anterior part of the tonsil or on the anterior faucial pillar is liable to extend to the neighbourhood of the tonsil capsule, and if ulceration occurs a deep vertical cleft is produced in this region sometimes before the surface or substance of the tonsil has been extensively invaded. In this type of case the prognosis is extremely unfavourable as the disease has in all likelihood invaded the fibrous and muscular structures of the pharyngeal wall. There is little doubt that a carcinoma may originate in the lining epithelium of one of the tonsillar crypts and for some time, possibly a long time, if the site of origin be deep in the crypt, give rise to no symptoms or signs. Such a tumour, according to its size and situation, may or may not reveal its presence to the palpating finger. Eventually, no doubt, it will cause a tumour or ulcer on the surface of the tonsil, but by the time this occurs the disease may be far advanced. Two cases of this sort have come to my notice.

The first was a woman who was sent to me by my colleague, Mr. Russell Howard, with a large mass on the right side of the neck. I failed to discover any primary focus for what was obviously a malignant condition of the cervical glands. Some weeks later I again examined the patient. A small irregular area situated on the surface of the right tonsil was noticed which, however, did not present the typical appearance of a carcinoma. I removed the suspicious tissue and under the microscope it proved to be a carcinoma.

This was the first case of carcinoma of the tonsil I had seen in a woman. Since then I have met with only two others.

A few years ago a man was sent to me with what appeared to be a very large malignant mass on the right side of the neck. On inspection no primary growth was observed, but remembering the patient to whom I have just referred, I carefully palpated the tonsils and found on the right side a tiny area showing increased resistance. I removed the tonsil by dissection. Dr. P. N. Panton and I examined the specimen together, and it was with considerable difficulty that we located in the substance of the tonsil a small nodule which was harder than the surrounding tissue. This proved on section to be a carcinoma.

If a tumour of such small proportions, not larger than a split pea, can give rise to a large mass in the neck, in this case as large as a tangerine orange, it seems quite probable that a very considerable metastasis in the cervical glands may be secondary to a tumour of such diminutive size that it may entirely elude detection. Possibly in cases where malignant cervical glands are diagnosed, and no primary tumour can be found it would be wise to enucleate the tonsil on the corresponding side and submit it to the pathologist. I think it quite likely that not a few cases of early cancer of the tonsil have been overlooked. The disease is certainly uncommon. Baker records that of 500 cases of cancer occurring in the practice of Sir James Paget from 1843–61, 2 occurred in the tonsil, 30 in the tongue, and 9 in the gums and palate.

Cancer of the tonsil shows a greater tendency to grow upwards into the palate or downwards so as to invade the tongue than to extend forwards or backwards. As is the case with intrinsic cancer of the larynx, retrocricoid pharynx, bowel, and other regions, it tends to develop in a ring-like fashion. However, in the situation under consideration, a tumour starting laterally has seldom passed far beyond the middle line before the death of the patient. It must be remembered that a growth which on superficial examination appears to be purely tonsillar may be found on palpation to be largely situated in the tongue probably having originated in that organ. In some cases the growth spreads to the upper or lower jaws, involving the mucous membrane of the alveolus, the ascending ramus, or even the cheek.

TREATMENT AND ITS RESULTS

Until recently cancer of the tonsil and fauces has proved almost hopeless even when treated by the most heroic operations. With modern methods, which include diathermy and radiation, results have been much more encouraging. Possibly at the present time in suitable cases a combination of these two methods is best. As in other regions, the presence or absence of glandular metastases forms a most important factor when considering the prognosis (see Table).

During the second half of the nineteenth century numerous attempts at the removal of tonsillar tumours were made. In 1859 Houel saw Nélaton operate on a carcinoma limited to the tonsil. In the same year Maissonneuve described several cases of carcinoma of the tonsil where caustics were applied to cause sloughing of the tumour. This method, called "cauterisation en flèches," did not create a favourable impression. Demarquay in 1862 exposed the great vessels by an incision in the neck, and while these were retracted by an assistant he removed a carcinoma of the tonsil with an écraseur and treated a recurrence a month later with the cautery. In 1865 Langenbeck removed a carcinoma of the tonsil through an external incision; the patient recovered from the operation. In 1869 Cheever, of Boston, independently treated a case of carcinoma of the tonsil by the same route, with success. Erichsen in the same year removed portions of an encephaloid cancer with the écraseur.

Newman in 1892 found 144 recorded cases of malignant disease of the tonsils, and knew of a patient operated on by Macewen who was well twelve years later. Jacobsen in 1901 described 95 cases from the literature. Of these cases, 29 of which were treated by buccal excision and 24 by the external route, 7 survived for more than two years. He was able to report a case, microscopically confirmed, free from recurrence eleven years after removal of the tumour by a galvano-cautery loop. Five other successful cases had previously been collected by Watson Cheyne. Mathews in 1912, who could report no success himself, published 25 cases treated by other surgeons with 3 living for three years, 2 being very early cases treated by the cautery. Berven, of Stockholm (1931), surveys the work of continental surgeons. Out of 116 cases operated on only three lived for three years, one of these living for seven years.

I record here a series of 51 consecutive cases, all treated by diathermy over five years ago. Of these 10 were not microscopically confirmed, 1 was a malignant endothelioma; the remaining 40 were all squamous-celled carcinomata.

The failure to make a microscopic examination in some cases was either due to the destruction of the tumours by diathermy prior to the routine use of the excision method, a biopsy beforehand being considered inadvisable, or to an oversight. It may be observed that not a single case in my whole series diagnosed clinically as cancer, removed by diathermy excision, and subsequently examined microscopically proved to be non-malignant. So characteristic indeed is a carcinoma in the region under consideration that for purely diagnostic purposes it is seldom necessary to make a preliminary biopsy. If a biopsy is considered necessary a small portion of the tumour should be removed by the endothermy knife. The pathological examination can often be left till after operation, but of course it should not be omitted, and it must always, when a specimen is available, include a report on the glands. Many cases treated by surgeons in the past and quite a number which have recently undergone treatment with rays are unaccompanied by any pathological report, but in the case of the primary growth the margin of error when the observer is a clinician of experience is probably negligible.

The results in my series are as follows:

RESULTS

Of 51 consecutive cases treated over five years ago, 11 lived over five years=22 per cent. (Of 41 cases microscopically confirmed, 9 lived over five years=22 per cent.)

Of the successful cases 7 patients are still alive after periods of 13 yrs. 4 mos., 10 yrs. 9 mos., 9 yrs. 2 mos., 8 yrs. 11 mos., 8 yrs. 10 mos., 7 yrs. 11 mos., and 6 yrs. 10 mos. Four have died after 14 yrs., 8 yrs. 5 mos., 10 yrs., and 5 yrs. 6 mos., and one after 13 years from a recurrence.

In addition to the 51 cases recorded, in 4 advanced cases death followed block dissection of glands and in 2 cases extraction of teeth, before the intended diathermy operation. In 4 cases the glands were explored and found to be inoperable. In the other 51 cases the state of the glands was:—

	Total treated.	Lived 5 years.	Per cent.
Gland carcinomatous.	23	3	13
Glands not involved..	28	9	32

Three patients who had secondary deposits in glands are still alive and well after 10 yrs. 9 mos., 8 yrs. 10 mos., and 7 yrs. 11 mos.

It is difficult to compare my results with those published by other workers, but it is to be hoped that these notes will be an aid to those who wish to assess the prognosis after diathermy. Douglas Harmer, Gordon-Taylor, Dan McKenzie, Gwynne Williams, and W. L. Clark, of Philadelphia, have reported favourably on diathermy, but none of these surgeons has described any number of tonsillar cases treated by this method. Colledge and Peacock, reviewing the work at St. George's Hospital for 1921–30, mention only a few cases, one of which lived for two years.

In recent years radiological methods have been employed. The best published results from radiation seem to be those obtained at Stockholm by Berven (1930), using a new technique, including the use of the radium bomb, but a further lapse of time is required before it can be shown if these will be as permanent as in the case of patients treated by diathermy. The most striking results from radiation have been obtained in cases of so-called lympho-epithelioma, but no tumour of this type occurred in this series of tonsillar growths, although I have met with examples in the nasopharynx and more recently in the tonsillar region.

(To be concluded)

BEQUEST TO HOSPITAL.—Dr. John Frederick Jennings, of John-street, Berkeley-square, W., who died on July 5th (and whose obituary appeared in THE LANCET of July 14th), left estate of the gross value of £47,660, with net personalty £45,790. Subject to a legacy of £500 to his wife, he left the whole of the property in trust for her for life, and then to St. Bartholomew's Hospital for the endowment of beds or the foundation of scholarships for medical students.

ARTERIAL HYPERTENSION *

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IT was a natural result of the discovery of a pressor body in the adrenal gland, that disturbances in the level of the arterial blood pressure should be attributed to excessive or defective secretion of adrenaline. This theory of hypertension has, it must be admitted, never won any general recognition, though many suggestive facts may be adduced in its favour, and though it has been vigorously advocated by the French school.

Among the arguments put forward for an adrenal factor in the production of permanent hypertension are the changes reported in the adrenal glands of hypertensive subjects, the alleged increase in the adrenaline content of hypertensive blood, the vascular lesions produced by adrenaline injections, and the frequent association of glycosuria, possibly of adrenal origin, with essential hypertension. More definitely significant, however, is the occurrence of permanent hypertension, accompanied by cardiovascular and renal lesions resembling those of essential hypertension, in patients in whom are found tumours arising from the chromaffin cells of the adrenal medulla, the so-called paragangliomata.

We cannot therefore ignore the possibility that the adrenal glands may be concerned, in some instances at least, in the production of a sustained high blood pressure. Physiological opinion would probably be adverse to such a view, since it is not disposed to regard the adrenal as concerned in the maintenance of vascular tonus, nor as a gland which is continuously pouring its active principle into the blood stream, but rather as a supplementary mechanism to be called into play only in emergencies.

Cannon,[1] whose opinion is entitled to the highest respect, believes that the evidence is against any sustained discharge of adrenaline, since the extremely sensitive denervated heart of the cat shows no change in rate after one adrenal has been removed and the secretory nerves to the other severed. The normal heart-rate is not therefore dependent upon adrenaline. As is well known, he regards the function of the adrenals as the preparation of the animal for muscular activity; under the influence of adrenaline discharge blood is shifted from the splanchnic area to the vessels of the muscles and heart, and this shift may even occur without any rise in the general blood pressure. In his cats, in which the sympathetic system was completely removed, and in which one adrenal was denervated and the medulla of the other removed, life proceeded in a normal manner in the quiet environment of the laboratory. Except that the animals were sensitive to cold, and incapable of responding to excitement by a rise of blood-sugar and of blood pressure, they were to all appearances functionally intact. Their resting blood pressure was apparently slightly low, which was to be expected, since the blood-vessels throughout the body were freed from the control of the central nervous system.[2]

The effect of ablation of the adrenals upon the blood pressure is disputed. There can be no doubt that the terminal stages of adrenal insufficiency are accompanied by a low blood pressure, and that at this period the fall in blood pressure is not entirely, if at all, attributable to lack of adrenaline. It has long been known that in the final phase of adrenal insufficiency concentration of the blood occurs, a concentration which is not affected by repeated injections of adrenaline.[3] In man a similar rise in the protein content of the serum has been observed during the crisis. Since the fall in blood pressure in animals shows an inverse relationship to the hæmoglobin content of the blood, it presumably results from a diminution in the volume of the circulating fluid.[4] In suprarenalectomised animals, maintained in health by injection of cortin, withdrawal of the cortical extract leads to a fall of blood pressure and concentration of the blood, which can be corrected by resumption of the injections (and administration of fluid), the blood pressure ultimately regaining the figure at which it stood before the extract was withheld. The extremely low blood pressure of the crises of Addison's disease therefore appear to be due to cortical rather than medullary deficiency, the cortical hormone regulating the water balance between blood and tissues. A study of the blood-sugar, the level of which has been regarded as in part due to continuous adrenaline secretion, leads to the same conclusion. In the crises, both in man and animals, a normal blood-sugar content may be found, though hypoglycæmia is the rule.[5] The blood-sugar is, however, an unsatisfactory index of adrenaline secretion, since its level is within limits largely conditioned by carbohydrate ingestion, and since some workers believe that the cortex is also concerned in the storage and utilisation of carbohydrates.[6]

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* The second Croonian lecture for 1934, delivered before the Royal College of Physicians of London on June 7th. Lecture I. was published in our last issue and Lecture III. will appear next week.

This terminal stage of hypotension is of less significance to us than the intermediate period between adrenalectomy and the onset of the symptoms which result from cortical deficiency; for, if the tonus of the vascular system is to any extent maintained by a sustained output of adrenaline into the blood, a fall of blood pressure might be expected to occur immediately after the adrenals have been removed. Unfortunately the experimental work upon this question has yielded conflicting results.

Some workers deny that ablation of the adrenals produces any immediate effect upon the blood pressure[7]; others find that a steady fall in the blood pressure follows bilateral adrenalectomy or ligature of the adrenal veins,[8] and that the blood pressure may be restored to a normal level if the adrenal vein of an intact animal is anastomosed to the jugular of the animal upon which the operation has been performed[9]; others, again, have observed a temporary fall in the blood pressure, followed by a rise, the suggestion in the latter case being that the adrenals function as an accessory mechanism in the maintenance of the vascular tone, and that its loss may be made good by the intervention of the vasomotor mechanism.[10]

The Blood Pressure in Addison's Disease

In default of physiological agreement, clinical observation of the human subject has a very definite value. This is especially the case since we have in Addison's disease a condition of chronic adrenal insufficiency which has not as yet been reproduced in animals, and since in man the blood pressure can be determined with ease, whereas considerable difficulties are met with in following the blood-pressure variations in animals over prolonged periods.

From the clinical standpoint, it is of course recognised that a low blood pressure is a cardinal symptom of Addison's disease, and that this hypotension is present during the remissions, between the crises, and before the terminal stage of extreme asthenia is reached. A low blood-sugar is also a common finding. The question, then, arises how far this hypotension and hypoglycæmia are the result of adrenaline deficiency. At one time an affirmative answer would have been given without hesitation; but it is now recognised that cases of typical Addison's disease occur in which the chromaffin tissue is to all appearances intact. In such patients the cortex of the gland shows fibrosis and atrophy, but the medulla is apparently healthy, though the blood pressure is at a low level and the blood-sugar content may be definitely subnormal.[11] At first sight such a finding would appear to definitely exclude any connexion between the low blood pressure of Addison's disease and medullary dysfunction, but it is doubtful whether such a conclusion is altogether justified. There is a rich anastomosis between the arteries of the cortex and medulla in the zona reticularis, and it is possible that cortical lesions may lead to interference with the medullary blood-supply. The question of a synergistic action between the two parts of the gland has also to be taken into consideration. Cramer,[12] on histochemical evidence, believes that the cortex participates in the formation of adrenaline, though preformed adrenaline is not found in the fresh cortex. Lastly, pituitary participation in the production of the low blood pressure cannot be excluded, since Kraus has observed that, in cases showing cortical fibrosis and atrophy, changes are present in the anterior lobe of the pituitary which are absent with the more usual tuberculous lesion of the gland involving the medulla.

Until we know more of the function of the cortex it is impossible to dogmatise as to the respective parts played by cortex and medulla in the production of the low blood pressure during the remissions of Addison's disease. In the acute crises of adrenal insufficiency in man, cortin, which contains no adrenaline, is stated to produce a moderate rise of blood pressure; in the remissions, the cortical extract, though it improves the general condition and the asthenia, is said to have little effect upon the blood pressure, which remains at a low level.[13] If this is the case, both cortical and medullary insufficiency may be concerned in the production of hypotension, the low blood pressure, which persists during the remissions, and which is unaffected by cortin, being the expression of adrenaline deficiency, while during the crises acute cortical insufficiency leads to a diminished blood volume and a further fall of pressure. It certainly seems improbable that lack of adrenaline plays no part in the production of the symptoms of Addison's disease, and Rowntree, who has had a unique experience of the treatment of these cases, believes that the Muirhead treatment, which consists of intensive adrenaline administration, often produces marked temporary improvement.

Hypertension due to Paraganglioma

Though it is uncertain whether adrenaline is concerned in the maintenance of normal vascular tone, and to what extent, if at all, the low blood pressure of Addison's disease is the result of chromaffin insufficiency, it remains possible that excessive secretion of the hormone may, in view of its known physiological action upon the blood pressure, be concerned in the production of hypertensive states. The emergency view of adrenal medullary function naturally biases us against the suggestion that adrenaline is responsible for permanent hypertension, but the question can only be settled by actual observation.

In this connexion the study of the symptoms and the pathological changes which are found in association with the paragangliomata is therefore of especial interest. There can be no doubt that these tumours are derived from the chromaffin cells of the adrenal medulla, or from the accessory chromaffin tissue, since their cells give a positive chromaffin reaction, and also the Vulpian iron chloride reaction for adrenaline. The presence of adrenaline has been demonstrated in the growths by physiological as well as chemical reactions. The amount present in a paraganglioma described by Kalk [14] was no less than 375 to 500 mg., as estimated by both methods, chemical and physiological, an enormous quantity when we consider that the total adrenaline content of the human adrenals is usually believed to be about 4 mg. The potentialities of uncontrolled adrenaline discharge from such a tumour may be gauged by the fact that 0·03 mg. introduced intravenously may temporarily raise the systolic pressure by 50 mm. Hg, and that an injection of 1 mg. has produced unconsciousness and collapse.

The symptoms presented by these patients are typical of excessive adrenaline discharge. Though in the majority of cases the details are incomplete, it is possible to build up from the literature a fairly complete picture of the course of the disease. In the earlier stages the attacks are usually acute and transient. In the well-known case described by Vaquez, the first symptom was the occurrence of brief attacks of hypertension lasting only some five to ten minutes. The blood pressure during the attack rose from 140/80 to 300/180 mm. Hg, and the pulse from 70 to 100. In a recently recorded case the rise of pressure during the attack was typical of that produced by intravenous injection of a moderate dose of adrenaline, the diastolic pressure rising but little and the pulse pressure increasing greatly.[15] Other symptoms of the attack are painful cramps in the extremities, colicky abdominal pain, anginal pain, mydriasis, dyspnœa, pallor, headache, and drenching sweats. Transitory albuminuria may follow an attack, and with the rise of blood pressure a rise of blood-sugar occurs with glycosuria. Retinal and cerebral hæmorrhage may result from the rise of pressure, and death may ensue from left ventricular failure with pulmonary œdema.

A female, 43 years of age, suffering from a paraganglioma of the adrenal, was recently admitted to my wards. She had first consulted her doctor, four years previously, for thirst, polyuria, and loss of weight, accompanied by attacks of severe throbbing headache, drenching sweats, and weakness. A glycosuria was then found which could not be controlled by diet; insulin treatment was instituted, but aggravated her attacks to such an extent that it was discontinued. A year previous to admission a retinal hæmorrhage occurred during an attack, and the blood pressure was found to be high. Since that time attacks of dyspnœa, precordial pain, and palpitations had occurred, without relation to exertion.

On admission the blood pressure was 180/120, with a forcible apex-beat and a loud aortic second sound; the pulse-rate varied from 100 to 120. Albumin, sugar, and acetone were present in the urine; the blood-sugar was 0·187 and the blood-urea 0·060 per cent. The tachycardia persisted in spite of rest in bed, and profuse sweats were noticed. Four days after admission an irregular pyrexia developed, accompanied by a leucocytosis of 17,500, with 88 per cent. of polymorphonuclears. On the eighth day she died with a sudden increase of the fever to 105°.

The post-mortem was performed by Dr. H. K. Goadby. A tumour of the right adrenal was present (4 in. by 2 in. by 2 in.), derived from the medulla, the cortex was spread over its surface in a thin layer, and on section the growth proved to be a paraganglioma. The first part of the aorta showed gross atheroma; the left ventricle was hypertrophied. The kidneys were finely granular, the capsule stripping with difficulty; microscopically, while the majority of the glomeruli were normal in appearance others showed varying degrees of fibrosis and hyalinisation. A considerable degree of vascular change was present in the kidney, the smaller arterioles being noticeably thickened and showing fibrotic and hyaline change; the medium-sized vessels showed thickening and fibrosis of the media. No cause for the terminal fever was discovered, and it may reasonably be regarded as a true adrenaline pyrexia.

The syndrome has also been noted in association with paragangliomata lying outside the adrenal. Thus, in a man of 53 suffering from intermittent glycosuria and polyguria, a tumour composed of chromaffin cells was found in the inter-renal region; cardiac hypertrophy and chronic nephritis were present. In default of definite paroxysms of hypertension while the patient is under observation, or of a history of such attacks, the diagnosis is often only made post mortem, the provisional diagnosis being insulin-resistant diabetes, uræmia, or a vascular accident resulting from essential hypertension.

THE PATHOLOGICAL CHANGES AND THEIR CAUSE

Two points are of special interest—the frequent development of permanent hypertension in these cases, and the occurrence of vascular or ichæmic nephritis.

The course of the hypertension appears to be variable. In some cases acute hypertensive attacks are superimposed upon a normal blood pressure; in others permanent hypertension may be present, and upon this may be superimposed hypertensive crises, during which the pressure rises to a still greater height; in others again the blood pressure is permanently high, and hypertensive attacks may be absent, but in some of these latter patients a history suggestive of such attacks may be obtained. In one case at least the transition from paroxysmal to permanent hypertension has been observed. It would seem that in the stage of permanent hypertension tachycardia is often present, and in such cases glycosuria, resistant to insulin, is frequently seen—findings which suggest that a continuous secretion of adrenaline is going on, and that the persistently high arterial pressure may be due to such hypersecretion rather than to organic vascular changes produced by the paroxysmal attacks.

The post-mortem appearances closely parallel those found in essential hypertension The left ventricle is considerably hypertrophied; the kidneys in some cases appear to be normal, in others they have been found to be red and granular, and microscopically have shown varying grades of vascular nephritis; the aorta usually shows well-marked atheroma, and advanced degeneration of the cerebral vessels may be present. In one case retinal arterio-sclerosis, with small hæmorrhages and patches of exudate, is reported. During life, in addition to the presence of albumin and casts in the urine, nitrogenous retention may occur.

It is obvious that the terminal picture of the disease resembles very closely that of essential hypertension, and that a rough parallelism may be traced between the course of the two conditions, since in both the hypertension is at the onset labile, but later tends to become more fixed.

The final proof that excessive adrenaline secretion is the cause of the symptoms in these cases is still lacking; adrenaline has not as yet been demonstrated in the blood of these patients during a crisis. In Vaquez's case this was attempted by Gley, but without success. In view of the technical difficulties this single negative finding is of little significance. Apart from the very close correspondence between the symptoms of the attacks and those produced by injections of adrenaline, the proved presence of large amounts of adrenaline in the tumour and the successful results of surgical intervention leave little room for doubt that excessive adrenaline discharge is responsible for the pathological changes present. Extirpation of a paraganglioma has in four instances led to the cessation of the paroxysmal attacks.[16]

Hypertension associated with other Tumours of the Adrenal

We have then in the paragangliomata a condition in which over-secretion of adrenaline leads to permanent hypertension and the associated cardiovascular and renal changes typical of essential hypertension.

It may be mentioned that, though other tumours of the medullary tissue, such as the ganglioneuromata, do not lead to hypertension, a few cases have been described in which permanent hypertension has been present in connexion with tumours of undoubted cortical origin, combined with other symptoms which are believed to result from cortical dysfunction. Such tumours usually show a structure resembling that of the adrenal zona fasciculata. The patient described by Murray and Simpson [17] is possibly an instance of this syndrome.

A female of 36 showed hirsuties, amenorrhœa, and a blood pressure of 200/112 in association with a cortical hypernephroma; the pulse-rate varied from 80–110. After removal of the tumour the blood pressure fell temporarily to 130, but was unstable, rising readily with excitement. Later it rose again to 200 with a pulse-rate of 112.

Similar but more convincing cases of hypertension in connexion with cortical hypernephromata and precocious sexual development have been described in children in whom a coexistent essential hypertension may be practically excluded. Thus in a fatal case in a child of 13 years the blood pressure was 158/85 and post mortem a malignant tumour of the cortex with secondary growths in the liver was found. Some of the older cases, in which no post-mortem was obtained, were almost certainly instances of the syndrome now described as due to a basophil adenoma of the pituitary, but a residuum remains in which a connexion between a tumour of the adrenal cortex and the raised blood pressure appears probable.[18] In definitely malignant tumours it is certain that we are not dealing with the adrenal cortical hyperplasia present in the pituitary basophil tumour. The blood pressure in the cortical adrenal tumours, when raised, does not apparently show the extreme instability characteristic of the early stages of the paragangliomata. There can be no doubt that hypertension is rare in the relatively common tumours of the adrenal cortex, in contrast to its almost invariable presence in association with tumours of the medullary chromaffin tissue. Its occurrence is of particular interest in connexion with the changes in the adrenal cortex and the associated variations in blood pressure met with in patients suffering from pituitary lesions, and also in view of the occurrence of a low blood pressure in those cases of Addison's disease in which the medullary tissue is apparently intact.

Adrenal Factors in Graves's Disease

Adrenal over-activity has also been invoked in explanation of certain of the vascular symptoms of the thyrotoxic state. The cardiovascular disturbances of Graves's disease in many ways resemble those produced by an intravenous injection of adrenaline. The characteristic change in the blood pressure, in at least the early stages of the condition, is a rise in the systolic pressure, the diastolic remaining at a normal or even a low level, and the pulse pressure as a result being greatly increased. The cardiovascular response to emotion is exaggerated. If we add tachycardia and a tendency to hyperglycæmia and glycosuria we have a syndrome strongly suggestive of adrenal activity.

If the adrenal is actually concerned in the production of these symptoms, it is conceivable that there is either an actual over-production of adrenaline or that thyroxine sensitises the tissues upon which adrenaline acts, as suggested by Trendelenburg. For both these possibilities evidence can be adduced. It is a well-established fact that thyroid feeding produces in animals definite hypertrophy of the adrenals, even in as short a period as two to three weeks. In prolonged experiments the adrenals may show an increase in weight amounting to as much as 50 per cent. over the controls.[19 20] The increase in size is, however, confined to the cortex, the lipoid content of which is considerably increased, while the medulla is generally believed to be unaffected. Herring alone believes that the medulla of the adrenal and the chromaffin tissue in general participate in the hypertrophy, and that the adrenaline content of the gland, as estimated by chemical methods, is increased. The cortical hyperplasia may be explained on Marine's theory of Graves's disease, according to which the adrenal cortex exercises an inhibitory influence upon the thyroid.

Surprisingly few data are available as to the condition of the adrenals in human thyrotoxicosis. It would seem that the adrenals of thyrotoxic patients are generally small, and that both medulla and cortex are diminished in size, though cellular hypertrophy has been described in the former.[21] The human findings, such as they are, do not necessarily negative the positive results obtained in animal experiments, since the human adrenals are obtained from severe cases which have terminated fatally. On the view that the adrenal cortex acts as an inhibitor of thyroid activity, they may be regarded as suggesting a primary adrenal cortical deficiency in the production of Graves's disease. In any case, they show little sign of the presence of over-active chromaffin tissue.

The sensitising of the tissues to the action of adrenaline by the thyroid hormone was at one time accepted as an undoubted fact, but the experimental results of the older experimenters can no longer be accepted, since they failed to recognise that there is a considerable latent period before the action of thyroxine becomes manifest.

It is doubtful, for instance, whether any significance is to be attached to the work of Levy,[22] who found a great enhancement of the pressor effect of adrenaline within one hour of stimulation of the cervical sympathetic, which is believed to be the secretory nerve of the thyroid. More recently it has been shown by König [23] and others [24 25] that removal of the thyroid leads to a definite reduction in the pulse and blood-pressure response to injections of adrenaline, while on the other hand there are indications that, after thyroid feeding for several days, the pressor effect of adrenaline is increased and that the isolated heart of such animals is responsive to dilutions of adrenaline to which the normal heart is insensitive. In the intact thyroxinised animal doses of adrenaline which are without effect in the normal animal produce various forms of cardiac arrhythmia, including auricular fibrillation, and may even prove fatal. The Goetsch adrenaline test for the presence of hyperthyroidism has, it is true, fallen into disuse, but its doubtful diagnostic value in clinical work is due rather to the fact that positive results are obtained in patients in whom no thyrotoxicosis is present, rather than to negative results in patients suffering from hyperthyroidism. Actually a very high percentage of positive results was obtained in thyrotoxic subjects.

The whole question has been again reopened by the discovery that thyroxine itself has a direct action upon cardiac muscle, increasing its rate, beat, volume, and oxygen consumption; the isolated heart of the thyroxinised animal continues to beat at an accelerated pace for many hours after its removal from the body, and the addition of thyroxine increases the rate of pulsation of fragments of embryo heart muscle beating spontaneously in tissue culture.[26] [27] In neither of these preparations can there be any question of the intervention of adrenaline, and it is necessary to assume that the thyroid hormone is capable of affecting the cardiac muscle directly. Though such a direct action of thyroxine upon the cardiac muscle may account for the basal tachycardia of hyperthyroidism, the participation of the adrenal in the cardiovascular symptoms of the disease is by no means excluded, since the heart, and probably also the vasomotor mechanism of the thyroxinised animal, are abnormally sensitive to adrenaline discharge.

Hypertension and Hyperthyroidism

Apart from any question of the relative importance of thyroid and adrenal factors in the production of the cardiovascular symptoms of Graves's disease, the relationship of thyrotoxicosis to hypertension and the course of the blood pressure in Graves's disease need some consideration.

At the outset no true hypertension is present; the systolic pressure is often elevated, but there is no corresponding rise in the diastolic, which may even be lower than in health. The blood-pressure findings suggest a vigorous contraction of the cardiac muscle with an increased beat volume, but without increase in the peripheral resistance. The possibility that a true hypertension with an increased diastolic pressure may develop as the result of thyrotoxicosis seems to have been originally suggested by Riesman. Boas and Shapiro [28] have described an interesting group of patients, predominantly female, in whom a gross rise of systolic and diastolic pressure is present, accompanied by signs suggestive of a thyrotoxicosis.

The condition was especially frequent at the menopause. Though in most of their patients no recognisable goitre was present and the eyes were not prominent, nervousness, excessive sweating, and loss of weight suggested thyroid hyperactivity. Ten patients out of 27 showed a basal metabolic rate exceeding the standard by more than 15 per cent. The diastolic pressure was not at the low normal level characteristic of frank hyperthyroidism, but was well above 100 mm. Hg, in some instances reaching 160 mm., and the blood pressure tended to increase over the period during which the patients were under observation. Many of their patients would in this country be classified as undoubted cases of toxic adenoma.

The interesting feature of these cases is the presence of a raised diastolic pressure in association with probable thyrotoxicosis. It may, of course, be objected that hyperthyroidism and essential hypertension were accidentally associated in these patients, and a similar objection applies to the series studied by Rosenblum and Levine.[29]

In their patients hypertension had originally been present in association with definite thyrotoxicosis; re-examining their cases at an interval averaging three years after partial thyroidectomy, the blood pressure was found to be as high as it had been before the operation, though the basal metabolic rate had fallen to a perfectly normal figure. The persistent high pressure was therefore completely independent of the presence of continued thyroid over-activity, a finding suggestive of coincident essential hypertension, though it is possible that the development of the hypertensive state had been in some way connected with the hyperthyroidism.

It is difficult to arrive at any definite conclusion as to the frequency with which true hypertension with a raised diastolic pressure is encountered in thyrotoxic patients. In a recent investigation of patients who showed no signs of active hyperthyroidism after partial thyroidectomy a remarkably high incidence of hypertension was noted by Bach and Bourne.[30]

At the time of examination the patients were gaining weight, and the pulse-rate was normal except in those cases in whom auricular fibrillation had supervened; the basal metabolic rate was not determined. Fourteen of 36 patients showed hypertension, and in all but two of these the diastolic pressure was above 90; four patients showing a raised blood pressure were in their third decade, a time of life at which essential hypertension is uncommon. The patients, as a whole, had suffered from active thyrotoxicosis for a considerable period.

Taking 140 and 90 mm. Hg as the upper limits of the normal systolic and diastolic pressure respectively, of 75 thyrotoxic patients whom I have examined 23 were definitely hypertensive. Excluding 17 patients in whom the disease had been present for less than two years, the percentage of cases showing hypertension is 39, a figure which agrees closely with that found by Bourne and Bach. In only 9 cases, however, was the diastolic pressure above 100 mm. Hg. The hypertensive group was definitely older and the disease was of slightly longer duration than in the patients with normal pressures. In a considerable proportion of the cases active thyrotoxicosis was present at the time of examination, but thyroid over-activity does not in the early stages of the disease lead to a rise in the diastolic pressure.

An elaborate study of the question of hypertension in hyperthyroidism has been made by Hurxthal.[31] The change in the blood pressure which followed operation was typically a fall in the systolic, accompanied by a rise in the diastolic, with a resulting reduction in the pulse pressure. He found that the basal blood pressure, taken at rest, in a series of 250 cases of exophthalmic goitre at an interval of 6 to 12 months after operation, ran closely parallel to the blood pressure of a control group of non-toxic goitres taken under similar conditions. The two groups were compared by age decades. Patients who had been operated upon for toxic adenomata of the thyroid showed a higher systolic and diastolic pressure than the controls in the fifth and sixth decades of life. Apart from this difference he could find no evidence that hyperthyroidism leads to permanent vascular disease. He supplies no data as to the length of time during which symptoms of active thyrotoxicosis had been present previous to operation.

It seems probable that there is an abnormal incidence of true hypertension with a raised diastolic pressure among thyrotoxic patients, more especially perhaps in cases where the thyrotoxic condition is of long standing. The hypertensive patients are not necessarily elderly; in my own series four were in the fourth and one in the third decade of life, but the duration of the disease in these cases had averaged eight years. Such hypertension apparently persists after the hyperthyroidism has been successfully dealt with by operation. No reason can be assigned for this increased blood pressure, but the possibility that the vascular system in hyperthyroidism is sensitised to the action of adrenaline remains open. The question is of some clinical importance and merits further investigation.

BASAL METABOLISM IN HYPERTENSION

The suggestion that the thyroid may be concerned in the production of hypertension naturally leads to the question of the basal metabolic rate of patients showing a high blood pressure. There would seem to be no doubt that an increase in the basal metabolism is commonly met with in hypertensive subjects. To judge from the figures available in the literature, an increase in the rate of more than 20 per cent. is frequent in essential hypertension, and in some instances the basal metabolism may exceed the standard by more than 50 per cent.[32] This increase is not necessarily associated with cardiac decompensation, nor does it appear to be related to the pulse-rate, to the presence of glycosuria, or to the coexistence of arterio-sclerotic renal damage. The rise in the basal metabolism does not run parallel to the height of the blood pressure, and in many patients with greatly increased arterial tension the basal metabolism may be at a perfectly normal level. Though at first sight the findings appear to be highly suggestive of an endocrine disturbance in essential hypertension, it is not improbable that the increased metabolism is the result of the cardiovascular condition and in no way connected with its cause.

Increased basal metabolic rates have been reported as occurring frequently in valvular disease of the heart,[33] even in ambulatory patients in whom the lesion is fully compensated; in decompensated cases with dyspnœa, rates as high as 70 per cent. above the standard may be found, and especially high rates are met with in association with the large heart of aortic insufficiency. The general run of the figures in patients suffering from valvular disease appear to be closely similar to that seen in essential hypertension. Though the hypertrophied heart and the vigorous action of the respiratory muscles in the decompensated cases must lead to an increased metabolism, the cause of the rise in the metabolic rate of cardiac cases in whom the cardiac lesion is compensated is not altogether clear, but the occurrence of this rise is certainly an indication for caution in interpreting the high metabolic rate of certain hypertensive patients as necessarily endocrine in origin.

The Adrenal in Essential Hypertension

There is then a group of patients in whom a permanently raised blood pressure is associated with the presence of a tumour of the chromaffin tissue and in whom the hypertension may be reasonably ascribed to excessive secretion of adrenaline; there is also the possibility that in some cases of persistent thyrotoxicosis true hypertension may ultimately develop, though here the part played by the adrenal is in doubt. Is there reason to believe that the chromaffin tissue plays an important rôle in the ætiology of what we call essential hypertension ?

No advocate of an adrenal theory of hypertension would suggest that the majority of essential hypertensives can be included in either group as at present recognised. Hypertensive patients with a past history of thyrotoxicosis are rare; still more infrequently do we meet with cases of essential hypertension in whom a history of the paroxysmal attacks of high blood pressure, characteristic of the paraganglioma, can be elicited. Since, however, permanent hypertension can apparently result from over-activity of the adrenal medulla, it might be argued that essential hypertension is actually adrenal in origin, though in the vast majority of cases it develops insidiously and without the dramatic symptoms of sudden and excessive adrenaline discharge.

The pathological anatomy of the adrenals of essential hypertensives admittedly affords little support for such a view. Though hypertrophy of the adrenals may be induced by stimuli which call for an increase in their activity, such as injections of insulin, and involves the medulla, such hypertrophy as is found in the hypertensive states is generally believed to be confined to the cortex. Nodular hyperplasia of the cortex was originally described by French authors as occurring in essential hypertension and in chronic nephritis, but the constancy of this relationship is disputed. The size of the medulla is difficult to estimate owing to its irregular shape. Goldzieher[34] and Wiesel appear to be alone in believing that the adrenal medulla is hypertrophied in hypertension, and that the phaocrome cells are increased in number.

One further observation of some interest but of doubtful significance is reported by Goldzieher. As is well known, the walls of the adrenal veins are peculiar in that they show a well-developed layer of longitudinal muscle. The function of this musculature is doubtful; it has been suggested that its contraction may close the lumen of the smaller vessels, or that it may compress the whole organ and empty the blood contained in it, together with its adrenaline content, into the general circulation. According to Goldzieher this muscular coat of the adrenal veins shows, on careful measurement, an indubitable hypertrophy in hypertensive states; its thickness is increased in renal disease, in essential hypertension, and in polycystic disease of the kidney. This hypertrophy he regards as the expression of prolonged adrenal hyperactivity, but it is possible that it may be correlated with the hypertrophy of the medial muscle of the arterioles in these conditions, as the result of the action of a pressor body in the circulation not necessarily derived from the adrenals.

Estimates of the quantity of adrenaline present in the glands of hypertensive patients are conflicting. It can only be said that even those who claim that it is increased find a comparatively slight excess, the amount of adrenaline present being in no way comparable to the enormous quantities present in the paragangliomata.

ADRENALINE CONTENT OF THE BLOOD IN HYPERTENSION

More definite conclusions as to the activity of the adrenal medulla might be drawn from the quantity of adrenaline present in the circulating blood. For a time any vasoconstrictor body present in the serum of hypertensives was accepted without hesitation as adrenaline, and for this reason the older work upon the subject is of little value. O'Connor, who adopted a more critical attitude, was able to show that bodies of this nature were formed during the process of clotting; they were not present in plasma or uncongealed blood, and differed from adrenaline in their resistance to aeration and in their physiological properties. Recently there has been a revival of interest in the question of the adrenaline content of peripheral blood, though it is admitted that its detection, if it is actually present, presents grave difficulties. Adrenaline is known to disappear rapidly from the circulating blood, though in our experience adrenaline added to blood in vitro is recognisable for at least 20 minutes by the intestinal strip method. A more serious difficulty is the extreme dilution in which adrenaline may be expected to be present; the highest concentration suggested for the adrenaline content of the blood of the adrenal vein is 1 : 360,000, and it is estimated that the adrenal venous blood is diluted approximately 200 times on reaching the general circulation. Consequently the maximum concentration of the hormone which we may expect to find in the peripheral blood is in the neighbourhood of 1 : 100,000,000, assuming that no loss occurs in its passage to the systemic circulation and in the process of estimation. Such dilutions are altogether beyond demonstration by chemical methods and approach the limits detectable by the exceedingly delicate physiological tests.

It is scarcely surprising, therefore, to find that recent attempts to determine the adrenaline content of the blood in various pathological conditions have given discordant results.

Kure,[35] for instance, using arterial blood transferred as rapidly as possible to the rabbit's ear, found that normal blood showed a vasoconstrictor action equivalent to a dilution of 1 : 2,000,000 adrenaline, and that the constrictor action of hypertensive bloods was twice as strong. Such figures can hardly be accepted, since they would indicate that the total circulating blood contained no less than 5 mg. of adrenaline, an amount equal to the total content of both glands and far in excess of any figure that has been suggested for adrenaline output. Other workers,[36] using the same method, but employing venous blood, find a more marked vasoconstrictor effect with hypertensive blood and with the blood of thyrotoxic patients than with normal bloods, but that the constrictor action was not due to adrenaline, since it was not abolished by ergotamine.

In an interesting series of experiments, Brandt and Katz,[37] using the three physiological test-objects—the rabbit's ear, the intestinal strip, and the enucleated frog's eye—examined the peripheral blood, venous and arterial, in conditions other than essential hypertension, in which adrenaline discharge might be expected to occur. They claim to have demonstrated typical adrenaline reactions, abolished by ergotoxin, in blood taken during insulin hypoglycæmia, a condition in which the symptoms of the reparative stage—pallor, sweating, tachycardia, and an increase in the pulse pressure—are typical of adrenaline discharge, and in which such discharge is believed to occur. They also found that adrenaline was present in the blood of patients suffering from vascular crises, that is in patients showing spasm of the arteries of the extremities, in angina, and in hypertensives during attacks of palpitation, pallor, and dyspnœa; during the quiescent periods in essential hypertension no adrenaline could be detected in the blood. If confirmed, these experiments would seem to be highly suggestive of the presence of adrenaline in the peripheral blood, venous and arterial, under certain conditions, since they were not limited to a single test-object and since the pressor activity of the blood was abolished by ergotoxin.

Our own experience, using the intestinal strip method, and venous blood, in which clotting was prevented by heparin, tested immediately after withdrawal, has been that the blood of normal individuals and of essential hypertensives showed no typical relaxing effect upon the intestine; an adrenaline-like inhibitory effect was not infrequently obtained with the blood of thyrotoxic patients, but was not actually due to adrenaline, since the reaction was unaffected by ergotamine.

It would seem that, though it is possible that adrenaline is demonstrable in the peripheral blood, under certain exceptionable conditions, in which discharge is supposed to occur, there is at present little reason to believe that the peripheral blood of hypertensive patients shows an increased adrenaline content.

SENSITISATION TO ADRENALINE

Even if no excess of adrenaline is present in the circulation of the hypertensive patient, it is conceivable that his vascular system might be sensitised to the hormone, and that the normal secretion of the gland might as the result evoke an excessive response. At one time it was suggested that cholesterol was such a sensitising body, and it was claimed that hypercholesterinæmia was common in hypertensive individuals. It is obvious, however, that an increase in the cholesterol of the blood is not necessarily followed by a rise in the blood pressure, since in such conditions as nephrosis and obstructive jaundice the quantity of cholesterol present far exceeds that found in essential hypertension, and yet the blood pressure remains at a perfectly normal level.

The suggested sensitisation of the vascular system to adrenaline has led to an extensive output of work upon the effects of adrenaline injection in various types of hypertension. It is impossible to study the sequence of events which follows such injections without being impressed with the complexity of the factors involved. Centrally the hormone produces an increase in the rate of the heart with coronary dilatation, on which may be superimposed inhibitory vagal effects; peripherally it leads to vasoconstriction, the response being conditioned by the degree of existing arterial tonus. My own experience, using the intravenous route to ensure absorption and a dose of 0·03 mg., has been that the response is almost entirely central; the injection is immediately followed by a great increase in pulse-rate and a marked rise in the systolic pressure; the diastolic pressure, as estimated by the auditory method, is often unaffected or at most rises by a few millimetres; the vascular tonus and resistance in the periphery is therefore not increased. No constant difference was noted between normal and hypertensive individuals, either as regards the increase in pulse-rate or pulse pressure. With this dosage and method of administration there seemed to be no evidence that the hypertensive vascular system responds abnormally to adrenaline.

If smaller doses are used it is claimed that the essential hypertensive is relatively insensitive to adrenaline, and that the initial effect of the injection is often a fall of blood pressure instead of a rise. Such a reversal of effect with minimal doses of adrenaline is well recognised as occurring in animals, but in the essential hypertensive the response is said to differ from that obtained in health and the fall in blood pressure has been cited as evidence of a "vagotonic" state. Attempts have also been made to demonstrate changes in the electrolyte concentrations in the blood which would account for such an increased parasympathetic tonus.[38]

It is alleged that the mean calcium content of the serum of essential hypertensives is at a slightly subnormal level, that the potassium : calcium ratio is higher than in health, and that, as a result, the assumed parasympathetic-sympathetic balance is upset in the direction of a parasympathetic preponderance. It is doubtful whether such speculations rest on any substratum of fact. Extreme variations of the serum calcium, such as we meet with in parathyroid tetany and in association with adenomata of the parathyroid gland, are not accompanied by corresponding changes in the level of the blood pressure, and in essential hypertension the cardinal sign of "vagotonia," a slow pulse-rate, is exceptional. Deicke and Hülse[39] find that an initial fall of blood pressure is uncommon in essential hypertension after minute doses of adrenaline, the reaction in the majority of cases resembling that seen in normal individuals; where a fall occurs, they believe it to be the result of defective filling of the left heart as the result of pulmonary vasoconstriction, since it is accompanied by a rise of pressure in the systemic veins.

Generally speaking, it may be said that all attempts to demonstrate that the vascular system of the essential hypertensive is abnormally sensitive to adrenaline have failed; the various suggested sensitising substances which have from time to time been brought forward as the cause of the condition have not stood critical examination, and the direct method of testing by adrenaline administration has shown that, if the vascular response of the hypertensive differs at all from that of the normal, it is in the direction of lowered, rather than heightened, sensitivity.

GLYCOSURIA

Indirect evidence of an adrenal factor in hypertension was at one time believed to be afforded by the frequent association of glycosuria and hypertension, the glycosuria being assumed to be of adrenal origin and to indicate excessive adrenaline discharge. There can be no doubt that in any extensive series of diabetics a considerable number of patients will prove to be hypertensive, but on analysis the abnormal incidence of hypertension is found to be limited to patients above 40 years of age; up to this age the blood pressures of diabetics and normal individuals run approximately parallel, with a tendency to low pressure among the diabetics; after the fortieth year the incidence of hypertension among the diabetics is about twice that found in non-diabetic individuals of corresponding age.[40 41] Similarly, in any group of patients who have come under treatment for symptoms attributable to hypertension, a proportion will show hyperglycæmia and glycosuria [42 43]; though this association does not, in my experience, occur in the exceedingly malignant, but rare, type of hypertension which occurs in the third decade. In some instances transitory glycosuria may be noticed to appear in a hypertensive patient while under observation and ultimately become permanent. The facts are most readily explained by the assumption that the ischæmic vascular lesion is apt to lead to a functional deficiency in the pancreatic insular tissue in hypertensives of some standing, a degenerative change occurring comparable to that seen in the kidney; of all organs of the body the pancreas, after the kidney, shows the most marked vascular change in essential hypertensives, and albuminuria and glycosuria are commonly associated in these patients. The occurrence of this type of lesion probably accounts for the frequent association of diabetes and hypertension after the fortieth year, that is, during the hypertensive period.

Against an adrenal origin of the glycosuria in these cases is the fact that the glycosuria met with in the paragangliomata is stated to be insulin-resistant, while that of the glycosuric hypertensive is not. Again, Cori [44] has shown that in man the hyperglycæmic response is elicited by half the amount of adrenaline necessary to produce a rise in the blood pressure; on this finding, if hypertension is of adrenal origin, we should expect glycosuria to be the rule rather than the exception in essential hypertension, unless some compensatory mechanism is developed.

THE HYPERTENSIVE FACTOR

It would seem that there is no adequate evidence that adrenaline is the factor concerned in the production of the raised blood pressure in essential hypertension. Admittedly, persistent hypertension is occasionally associated with the presence of adrenal paragangliomata, and in such cases the raised blood pressure is almost certainly the result of over-secretion of the hormone by the tumour. Such cases, though unimportant numerically, are theoretically significant, since they show that over-secretion of adrenaline may ultimately produce permanent hypertension, and that vascular and renal lesions resembling those found in essential hypertension may result. The recognition of such a possibility gives a fresh impetus to the search for a humoral factor with a pressor action in the hypertensive, but it is doubtful whether adrenaline is the body to which attention should be directed. In certain respects the symptoms of essential hypertension are not those of hyperadrenalinæmia; tachycardia in the earliest stages is infrequent, the diastolic pressure is raised from the outset, and, though hyperglycæmia and glycosuria are not uncommon in hypertensive patients, there are strong grounds for believing that they are not of adrenal origin.

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HOSPITAL TREATMENT FOR A GUINEA A YEAR.—A scheme is being arranged by the Forbes Fraser Hospital at Bath whereby for a guinea a year a man and his family can ensure nursing and maintenance. There is no income limit, but the age limit is 60. The benefits are: (1) payment at £3 3s. a week for nursing and maintenance at the Forbes Fraser Hospital for not more than four weeks in any 12 months; (2) a similar payment for nursing and maintenance to a paying patient at any other hospital or nursing-home approved by the committee; (3) payment for ambulance, when necessary, with a maximum of £1 in any 12 months. The scheme makes no grant for the payment of doctors, which must be arranged by the contributor. No assistance is given in confinements or cases of mental or infectious diseases. Accident cases where maintenance charges in hospital are covered by legal compensation are also not included in the scheme.

AGGLUTININ RESPONSE TO RECENT ANTI-ENTERICA VACCINATION

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In a paper published in the *American Journal of Immunology* in 1924 a claim was advanced by Felix that by means of qualitative serum analysis distinction could be drawn between agglutination due to protective vaccination and that occurring during the course of enterica disease. Thus whereas both large-flaking H agglutinins and small-flaking O agglutinins were produced in the serum of enterica patients, H agglutinins alone occurred as a result of T. or T.A.B. inoculation. In 1928 this observation was confirmed by Stuart and Krikorian, who found that unvaccinated persons suffering from enterica infections exhibited in their blood both H and O agglutinins, rarely small-flaking alone (3 cases in 14) and exceptionally the large type without the small (1 case in 14). On the other hand "in the sera of vaccinated human beings not so suffering," they continued, "there is a production of large-flaking labilotropic agglutinins only and in no dilution is there any evidence of small-flaking, stabilotropic agglutinin formation."

These contentions of Felix and of Stuart and Krikorian have since been challenged by Gardner (1929, 1930), Whitehead (1930), Smith (1932), Wyllie (1932), Horgan (1932), Mudd (1932), and Dulanay, Wikle, and Trigg (1932); O agglutinins in varying titre have been successfully evoked by all these workers in persons vaccinated by the ordinary subcutaneous route.

It occurred to us that the discrepancy might be explained by a difference in the methods of vaccine preparation. An experiment was, therefore, devised to determine, if possible, what influence, if any, the mode of manufacture might exert on the agglutinin-producing power of a vaccine.

EXPERIMENTAL EVIDENCE ADDUCED

From Rawlings's strain of *B. typhosus* a quantity of antityphoid vaccine was first prepared: a 24 hours' growth of the organism on agar was washed off with normal saline solution and standardised to contain 1000 million bacteria per cubic centimetre; thereafter the vaccine was killed in a water bath at 60° C. and divided into three equal portions, to one of which 1 per cent. phenol was added, to another 0·5 per cent.; the remaining third was left uncarbolised. These vaccines, *after only three days' storage* in the ice-chest, were used to inoculate rabbits, of which three series, each consisting of three animals, were then treated. Rabbits 1 and 2 of each series were in each case given by the subcutaneous route a vaccine dosage of 2 c.cm.; rabbits 3 of each series 1 c.cm. intravenously. Eight days later the rabbits were bled and their sera qualitatively and quantitatively analysed. They were then inoculated with a second dose of appropriate vaccine identical in every respect with that first administered and were thereupon returned to the animal house for further observation.

The results of the agglutination tests performed on the sera of the rabbits eight days subsequent to primary vaccination were remarkable (Table I.A): whereas animals treated with vaccine preserved with 1 per cent. phenol showed in their blood a relatively low titre of O agglutinins (1 : 500), those treated with the uncarbolised vaccine exhibited well pronounced O agglutination in a serum dilution of 1 : 10,000; in the series in which the 0·5 per cent. carbolised vaccine had been employed, the O agglutinin content proved to occupy an intermediate position. No difference in the H agglutinin production was found to exist among the several series dealt with. Repeat experiments afforded like results.

TABLES I.A AND I.B

Agglutination Titres in the Sera of Rabbits Protected with Carbolised and with Non-carbolised Antityphoid Vaccines

(a) Eight days after the first inoculation

Rabbit No.	With phenolised (1 per cent.) T.			With phenolised (0·5 per cent.) T.			With non-phenolised T.		
	Agglutination with—			Agglutination with—			Agglutination with—		
	Living.		Formolised.	Living.		Formolised.	Living.		Formolised.
	O901	G3	T	O901	G3	T	O901	G3	T
1	500	—	500	2000	100	500	10,000	1000	1000
2	200	100	200	2000	200	2000	10,000	500	1000
3	1000	100	1000	5000	200	5000	10,000	500	5000
(b) 15 days after the second inoculation									
1	1000	100	5000	500	—	500	2000	—	200
2	500	—	500	1000	—	1000	2000	100	5000
3	2000	200	10,000	5000	200	10,000	10,000	—	1000

Tables I.B and III. are inserted to show the results of agglutination tests performed on the same experimental rabbits' sera 15 days and 3 months respectively after the date of the animals' second inoculations.

It may now reasonably be inferred that in rabbits the administration of killed typhoid bacilli in vaccine form is capable of producing vital reactions similar to those evoked by living strains during enteric disease; it may further be suggested that the relative inability of ordinary antityphoid vaccines to elicit O agglutinin response in the serum of treated rabbits is due to an impairment of the O agglutinogens in such vaccines by the phenol or other coal-tar derivative invariably used in their preservation.

TABLE II

Agglutination Titres in the Sera of Human Beings compared after Antityphoid Inoculations with (a) Carbolised (1 per cent.) Vaccine (b) Non-carbolised Vaccine—15 days after the Second Inoculation

Titres after the use of phenolised vaccine.			Titres after the use of non-phenolised vaccine.		
Agglutination with—			Agglutination with—		
Living.		Formolised.	Living.		Formolised.
O901	G3	T	O901	G3	T
200	—	10,000	1000	100	500
200	—	2000	500	—	2000
100	—	5000	200	—	500
200	—	2000	2000	200	2000
200	—	2000	2000	100	1000
200	—	1000	1000	100	2000
200	—	10,000	500	100	1000

Note.—T = *B. typhosus*. G3 = *B. enteritidis* Gaertner. O901 = O variant of strain 901 of *B. typhosus*. The figures under the heading "Living" indicate the titre of O agglutination. The figures under the heading "Formolised" indicate the titre of H agglutination.

Next, with a view to determining whether comparable reactions follow the use of such vaccines in human beings, we inoculated with T. vaccines 14 persons who were without history of enterica disease or of previous prophylaxis and whose sera contained at first no detectable agglutinins. The vaccines, prepared, stored, and taken into use as described above, were exhibited in a dosage of 0·5 c.cm. followed 8 days later by 1 c.cm.; 7 persons were treated with a vaccine containing 1 per cent. phenol, 7 with a non-carbolised vaccine. Serum analysis was made in each case 15 days after the second inoculation and again 3 months thereafter. Tables II. and IV. summarise the results obtained. The findings in Table II. go to show that in human beings just as in rabbits dead typhoid bacilli can evoke the production of both O and H agglutinins in a manner and degree similar to that seen to be developed in the course of enteric disease. Moreover it would again seem likely that the relative inability of anti-enterica vaccines produced and preserved in the usual way to induce the formation of O agglutinins is due to some deleterious influence exercised by the coal-tar derivatives on the heat stable antigen, an influence probably increasing with the duration of storage.

PERSISTENCE OF AGGLUTININS

In rabbits protected with two doses of non-carbolised antityphoid vaccine residual O titres of 1 : 200 and 1 : 500 were still demonstrable after three months; within the same period, however, O agglutinins had disappeared from the sera of rabbits treated with an identical dosage of carbolised vaccines (Table III).

TABLE III

Relative Persistence of O Titres in Sera of Rabbits Protected with Carbolised T. Vaccines and with Non-carbolised T. Vaccines—3 months after the Second Inoculation

Rabbit No.	With phenolised (1 per cent.) T.			With phenolised (0·5 per cent.) T.			With non-phenolised T.		
	Agglutination with—			Agglutination with—			Agglutination with—		
	Living.		Formolised.	Living.		Formolised.	Living.		Formolised.
	O901	G3	T.	O901	G3	T.	O901	G3	T.
1	—	—	100	—	—	200	200	—	200
2	—	—	200	—	—	200	500	100	200
3	100	—	1000	2000	—	2000	5000	100	050

TABLE IV

Agglutination Titres in the Sera of Human Beings compared after Antityphoid Inoculations with (a) Carbolised (1 per cent.) Vaccine, (b) Non-carbolised Vaccine—3 months after the Second Inoculation

Titres after the use of phenolised vaccine.			Titres after the use of non-phenolised vaccine.		
Agglutination with—			Agglutination with—		
Living.		Formolised.	Living.		Formolised.
O901	G3	T	O901	G3	T
100	—	1000	1000	—	200
100	—	500	200	—	1000
—	—	500	200	—	200
—	—	500	1000	100	1000
100	—	200	1000	100	1000
—	—	100	500	100	500
100	—	5000	500	—	2000

Table IV. complements Table II. and shows that O titres of 1 : 100 may persist in human beings for at least three months after vaccination with carbolised (1 per cent.) T. prophylactic, and that O titres varying from 1 : 200 to 1 : 1000 may still be present after the lapse of an equal interval following treatment with non-carbolised vaccine. Specially noteworthy is the agglutination of *B. enteritidis* Gaertner G3 (Tables II. and IV.) effected by the sera of persons immunised by non-carbolised vaccine.

DISCUSSION.—SUMMARY

A study of the foregoing experiments will make it clear that in human beings O agglutinin formation takes place as readily and often in as high degree after inoculation with suitable anti-enterica vaccines as it does during the course of enteric disease. In this respect a better response has been obtained here with non-carbolised vaccines than with those preserved even for a short time in low concentrations of phenol. An explanation has been sought in the apparently adverse, although admittedly unknown, effect exercised by the phenol on the heat-stable antigen. It is known, for example, that when typhoid immune serum is brought into contact with the phenol-preserved suspension of *B. typhosus* known as Ficker's diagnosticum, the O agglutination altogether fails; it is suggested that in ordinary T. and T.A.B. vaccines the exposure of the O agglutinogen to the action of phenol over varying periods of time may ultimately lead to a loss of antigenic power and thus to an absence of O agglutinins in the vaccinated persons' sera.

Now it has been advanced by Felix that in the typhoid-paratyphoid group the bactericidal amboceptors as well as the complement-binding immune bodies are identical with the small flaking O agglutinin and owe their existence to the stable antigen, and this view has received the support of Weil (1921), Savage and White (1925), Balteanu (1926), and Arkwright (1927), the last of whom concludes that "the heat-stable, smooth O agglutinogen is probably identical with the antigen which produces resistance and with the smooth heat-stable agglutinable substance." It is indeed now agreed that in order to be efficient an antityphoid vaccine should produce antibodies against the stable antigen; but all anti-enterica vaccines do effect to a greater or less extent the formation of O agglutinins in the majority of human beings, provided such vaccines are of relatively recent manufacture and administered in adequately interspaced dosage. It is not, therefore, a question of finding a method of vaccination which will fulfil this demand for O agglutinin production, but a method which will ensure the maximum production and persistence of these antibodies. The investigation carried out here inclines us to the view that anti-enterica vaccines issued without the addition of a preservative, and inoculated shortly after preparation, best meet the case.

The appearance and persistence of O agglutinins in significant titres follow in human beings and in rabbits the use of ordinary recently prepared anti-enterica vaccines, but would appear to be more marked in the case of vaccines to which no phenol has been added as preservative.

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RHEUMATOID ARTHRITIS AND ITS TREATMENT BY GOLD SALTS*

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Since Mollgaard of Copenhagen demonstrated that injections of gold salts would arrest the progress of tuberculosis, this treatment has been applied widely and often very successfully. It was rational therefore to suggest that the same remedy might be of service in other diseases of infective origin. Extensive research has been carried out during the past five years on more than 500 cases of rheumatoid arthritis, with results that have justified this assumption; gold salts have, indeed, been far more successful than any remedy previously employed.[1] [2]

In 1928 a group of the severe types of polyarthritis were selected for trial with gold salts, and while at first a small proportion of cases showed reactions such as stomatitis and erythema due to overdosage, the net result after two years was improvement almost amounting to cure in 60 per cent. True rheumatoid arthritis, infectious arthritis (gonococcal or others) of the polyarticular or monoarticular type, and the attenuated conditions of tuberculous arthritis all respond readily to gold therapy, though it must be emphasised that the earlier the conditions are treated the quicker and more convincing the results. Another group responding favourably is spondylitis ankylosans, especially in its early stages. Confirmation of these results has been published by Slot and Deville,[3] Umber,[4] Zimmer,[5] and others.

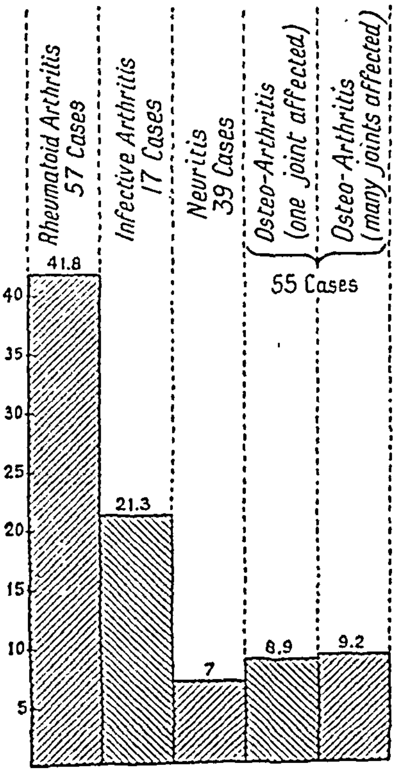
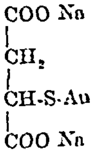


FIG. 1.—Diagram showing average figures for the sedimentation-rate (in millimetres) after one hour in various forms of rheumatism.

ACTIONS AND REACTIONS

The effect of treatment can be determined only by observation of the temperature curves and periodic determinations by the Vernes resorcin flocculation and the sedimentation tests (*Fig. 1*). *In the* former the range for normal subjects is from 5–20. Anything over 30 suggests a pathological condition infective in origin. In the latter test a high sedimentation-rate likewise denotes a pathological condition. Since cure, and not temporary improvements, is the objective, the treatment must be continued until the temperature curve and the respective tests show normal figures over a prolonged period (Fig. 2). It is equally important that a thorough clinical examination be made to ensure renal, hepatic, and other sufficiency.

Choice of Gold Salts.—The intramuscular route is best for the treatment of such a chronic disease, for the salts may be given by a skilled nurse or even the trained relations of the patient. The first salt I employed was auro-thio-propanol-sulphonate of sodium (*Allochrysine Lumiere*), but since 1932 gold salts in oily suspension have been employed. These are less liable to cause reactions while retaining their potency. More recently the aurothiomalate of sodium (Myocrisin)† has been used. It is water-soluble and lipo-insoluble, but is readily absorbed in oily suspension, and its formula is as follows:—



$$\begin{array}{l}\mathrm{COO\,Na}\\ |\\ \mathrm{CH_2}\\ |\\ \mathrm{CH\text{-}S\text{-}Au}\\ |\\ \mathrm{COO\,Na}\end{array}$$

The aurothio-glycolate of calcium (Myoral) is insoluble in water and oil, hence it is absorbed more slowly. Myocrisin may be given in weekly injections of 0·1 to 0·2 g. The total amount for one series should be between 1·5 g. and 2 g. Several series should be given successively with intervals of six to eight weeks. Much larger doses have been given in certain cases, but it is not recommended as a routine for anyone with limited experience with gold compounds. The third gold salt used in oil suspension is aurothioglucose (*Oleo-Solganol B*).

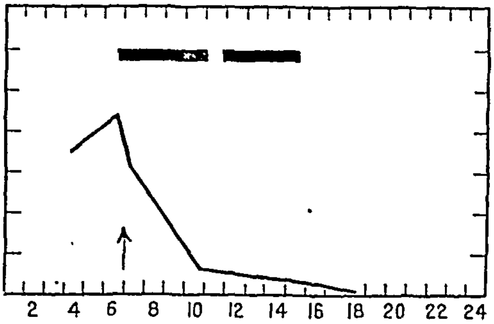


FIG. 2.—Graph of sedimentation-rate of the red corpuscles (first hour figures). Case of rheumatoid arthritis of 18 months' duration in a man, 57 years of age. Graph shows a rise in the sedimentation-rate before treatment and a rapid and steady fall to normal rate after two series of injections of gold salts (indicated in black). The dose of gold salts given was 2·6 g.

It is not advisable to administer gold salts orally at the present stage of our knowledge, and the salt chosen must be given in regular dosage with definite intervals of rest; otherwise failure or relapse will ensue after a partial improvement. The dosage necessary for treatment in rheumatoid arthritis is much smaller than that employed in tuberculosis. The allergic condition of arthritic patients explains the fact that they are more susceptible to the drug.

Reactions may be focal, general, or local. Local reactions are rare, for injections of gold salts cause no irritation with careful technique. Focal reactions include pain or increased swelling in the joints and are met with in about a third of the cases, diminishing from the third to the tenth injection. General reactions involving malaise, rise in temperature, and pulse-rate are rarely encountered. Pruritus and urticaria may be present, but unless severe they do not indicate change of treatment.

Attempts to treat patients with incomplete or single series of doses have met with no success, and only lead to relapse after improvement has begun.

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* A summary of the Hunterian lecture of the Hunterian Society for 1931.

† Myocrisin is manufactured in England by Messrs. May and Baker, Limited.

Other reactions described by Milián under the term "biotropisme" may reveal symptoms of another existing disease hitherto unsuspected. In a few cases boils and herpes zoster have been noted, all apparently due to latent disease. Their presence, however, need not prevent treatment, and they gradually disappear.

Untoward Symptoms.—Albuminuria and renal insufficiency are only seen in predisposed patients. Disturbances of the skin and mucous membranes are met with most often, and are generally proportionate to size of dosage. Diarrhœa is occasionally experienced. As a rule the reactions are not sufficiently frequent or grave to interfere with the course of treatment, though many German authors advocate 40–80 g. of glucose given orally during the entire course of the treatment to obviate skin trouble. In France total hepatic extract grs. 10 twice daily by mouth, or twice a week by injection, is given. Thiosulphate of sodium and magnesium is also useful in preventing reactionary symptoms.

RESULTS

Clinical Results.—The first sign of improvement is relief of pain, and the patient is able to perform movements impossible before treatment. The second sign is reduction of swelling and its eventual disappearance. There is improvement in the general health, appetite increases, the skin looks more healthy, and there may be gain in weight. The temperature curve is the surest indication of the progress of cure.

When the soft tissues of the joint alone are involved gold salts will completely restore the function, but where the condition is long standing with muscular atrophy and eroded cartilages, fibrosis, and retractions treatment is not so successful. The process of chronic inflammation can, however, be stopped and the progress of the disease arrested.

A patient of 35 years had been affected for 13 years with polyarticular rheumatoid arthritis of both knees, one hip, both wrists, and an ankle. She could go with difficulty a few steps on crutches and was in constant pain. Two series of injections of gold salts were administered, and ten months later she was able to walk with a stick and to resume her work. The improvement was maintained by regular series of injections of gold salts at wide intervals.

Laboratory Results.—When laboratory tests have returned to normal figures a last series of injections is usually given. The patient is then asked to return at three-monthly intervals for the next two years for sedimentation-rate and resorcin-flocculation tests. If these remain normal and no other symptoms are present no further injections are given.

The sketches (vide Fig. 3) by Hans Jansen of Copenhagen form a basis for comparison of joint changes, which will reveal to the physician the "cleaning off" process of the joints.

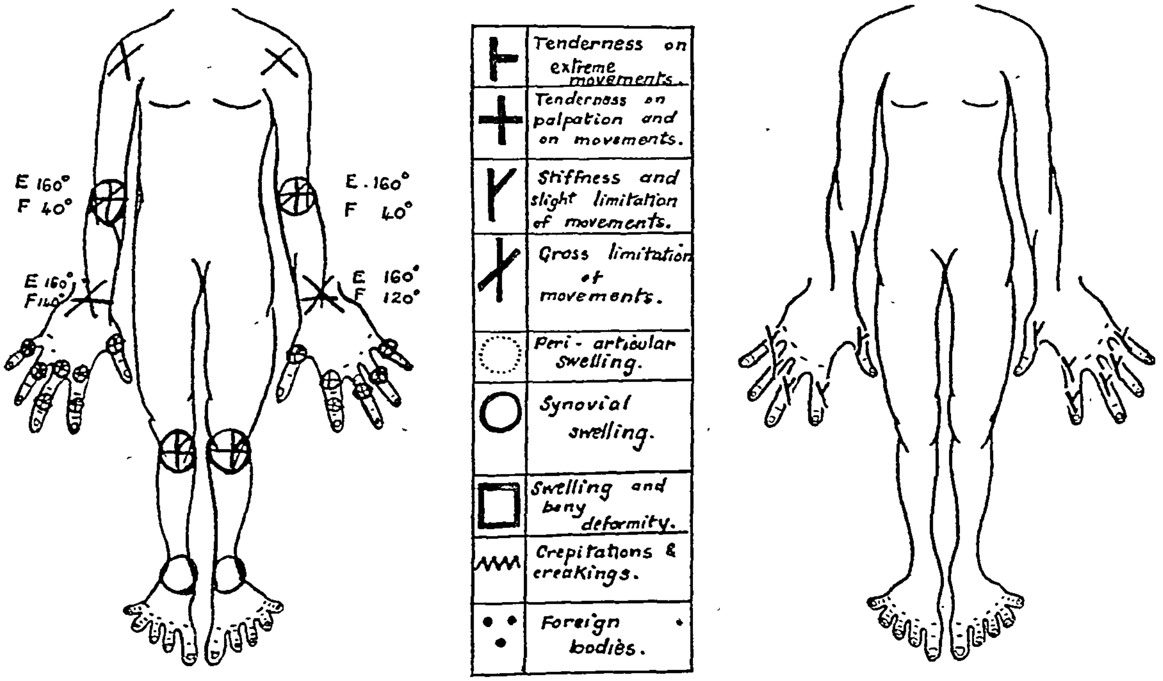
E 160°
F 40°
E. 160°
F 40°
E 160°
F 110°
E 160°
F 120°
Tenderness on extreme movements.
Tenderness on palpation and on movements.
Stiffness and slight limitation of movements.
Gross limitation of movements.
Peri-articular swelling.
Synovial swelling.
Swelling and bony deformity.
Crepitations & creakings.
Foreign bodies.

FIG. 3.—Diagram using Jansen's ciphers, demonstrating joint changes before and after treatment (same case as in Fig. 2). The improvement in the joints corresponds to the fall to normal of the sedimentation-rate curve.

Summary of Total Results.—Over 500 patients have been treated, and of these 70–80 per cent. have responded well to gold therapy. Among these 50 per cent. of recent cases and 20 to 30 per cent. of cases of more than two years' duration have been permanently cured by 2–5 series of injections, and remained cured with no further treatment for two or three years. Such figures show the importance of early treatment, and compare favourably with other therapeutic measures in rheumatoid arthritis.

Vaccine therapy is of little use except in very early cases, but endocrine preparations may be given complementary to gold salts, especially in middle-aged women, and when once the inflammatory process has been reduced various forms of physiotherapy and spa treatment may be advised with advantage.

Twelve chronic cases with irreducible vicious ankylosis of one or many joints had these reduced under anæsthesia after preliminary injections of gold salts. There were no inflammatory reactions in spite of such drastic treatment. Passive and active mobilisation were started two days after the operation. A re-education of the joints was practised in the thermal swimming pool. Bedridden patients were made to walk after four to six years' invalidity.

Interpretation of Results.—The hypothesis is put forward that the development of rheumatoid arthritis is accompanied by tuberculous infections, but that it requires another infective element such as tonsils or teeth to provide it. Gold salts appear to be the most active means of treatment for rheumatoid arthritis, and this condition is amenable to cure in a very considerable proportion of early cases.

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COOLEY'S ANÆMIA

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IN 1927 Cooley drew attention to an anæmia occurring usually in children of Mediterranean parents, associated with splenomegaly, a definite type of mongoloid face, and characteristic changes in the bones, particularly those of the skull and hands. The characteristics were those which in England might at one time have been grouped under the name of von Jaksch's anæmia, and it was in an attempt to define at least one definite disease as conforming somewhat to von Jaksch's original descriptions that Cooley separated the condition from the many other anæmic states of infancy and childhood. On account of its predilection for the Mediterranean races the condition is sometimes known as "thalassæmia."

Cooley has described one case in an English girl but the majority of others, such as those of Capper, have been in children of Mediterranean stock. The bony alterations caused by hyperplasia of the bone-marrow were first described by Brannan and definitely demonstrated with radiograms by Cooley, Witwer and Lee, Vogt and Diamond, as well as by Whipple.

The following case exhibits most of the clinical and hæmatological features which Cooley describes. We believe it to be the first example in a child to be reported in this country.

CLINICAL RECORD

The patient was a girl, aged 1 year and 6 months, the only child of Greek parents. The father and mother are not related and are both essentially healthy, although the father is stated to be rather anæmic and a paternal grandmother has been anæmic for many years. The child was born in the Middlesex Hospital on Nov. 1st, 1932, and weighed 7 lb. 3 oz. There are no other children in the family but the mother had a miscarriage in 1931, 13 months before the birth of this child. The child was normal at birth, not jaundiced, and progressed normally with breast-feeding until about three months of age. She was brought regularly to the infant welfare department of the Middlesex Hospital and then failed to attend for nearly seven weeks, during which time it was noted that she had become very pale. There was some difficulty over feeding at this time, the supply of breast-milk being insufficient and complementary feeding with a dried milk containing extra iron was instituted. Shortly after this, at the age of five months, corresponding to another change in the diet by the mother who began to give Grade A cow's milk on her own initiative, the baby had an attack of screaming and colic, with vomiting and blood in the stools. She was admitted for observation as a possible case of intussusception, but there was no tumour to be felt and all symptoms rapidly disappeared.

The child then continued to attend the infant welfare department fairly regularly and in April, 1934, suffered from an acute upper respiratory tract infection, after which the pallor became more noticeable and an enlarged spleen was felt. She had from the ninth month onwards been taking a good mixed diet. She was admitted for further investigation on April 21st.

Physical examination.—She is a moderately well-nourished child, weighing just over 19 lb. There is a curious tint to the skin which appears to be a mixture of pallor and pigmentation of the race. The mucous membranes are all pale—there are no bruises or petechiæ. The face is not abnormal in appearance and there are no abnormal swellings to be felt over the skull or other bones. The heart is rapid (rate 130–140 at rest) but not enlarged, and there is a systolic murmur at the apex. The spleen is markedly enlarged but not unduly hard. The liver is felt about 1 in. below the costal margin. The lymphatic glands are not enlarged except for a few small glands in the neck. The lungs are normal. Genito-urinary system normal and urine (see below) does not contain albumin or sugar. There are 16 teeth, all in good condition. The tonsils are not enlarged. The central nervous system presents no gross abnormality. Optic fundi pale but no hæmorrhages.

Blood examinations gave the following results:—

Date	April 10th.	April 25th.	May 4th
Red cells per c.mm. ..	3,160,000 ..	2,970,000 ..	3,070,000
White cells per c.mm. ..	18,600 ..	9,200 ..	22,800
Hæmoglobin per cent. (Haldane)	38 ..	40 ..	40
Colour-index	0·5 ..	0·7 ..	0·65
Differential count per cent.—			
Neutrophil polymorphonuclears	34 ..	25 ..	23
Lymphocytes	62 ..	70 ..	65
Large mononuclears ..	3 ..	5 ..	10
Eosinophil polymorphonuclears	— ..	— ..	2
Mast cells	1 ..	— ..	—
Myelocytes	— ..	1 seen ..	—
Myeloblasts	— ..	— ..	—
Anisocytosis	+ + + ..	+ + ..	+
Poikilocytosis	+ + ..	+ ..	+
Polychromasia	+ + ..	+ ..	+
Reticulocytes per 100 red cells	— ..	5 ..	—
Normoblasts per 100 white cells	17 ..	10 ..	3

Price-Jones curve (see Figure) shows broad base and high coefficient of variation. Modal means by halometer 7·2 μ. Fresh blood preparations show no sickling—this to exclude the occurrence of sickling in Greeks as described by Cooley and Lee (1929). Fragility of red cells showed a slightly increased resistance to saline solutions when tested quantitatively. Hæmocrit reading showed: volume index, 0·87; saturation index, 0·8; Wassermann reaction, negative.

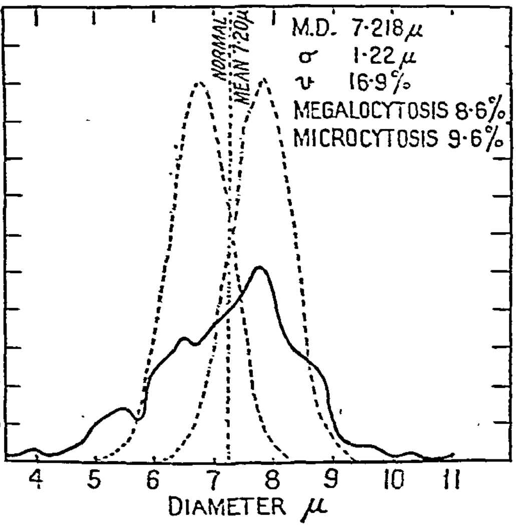
Biochemical investigations.—Blood-urea 26 mg. per 100 c.cm., non-protein nitrogen 25 mg., hæmoglobin 5·5 mg.; plasma proteins: albumin 4·6 mg. per 100 c.cm., globulin 3·0 mg., fibrinogen 0·24 mg., cholesterol, the low figure of 170 mg.; calcium, 10·0 mg.; phosphates, 5·0 mg.; phosphatase 13 units (method of Jenner and Kay, 1932). The figure of 13 units falls within the normal limits of 11·7–14·2 as determined by Dr. J. D. Robertson on a group of four children at this age-period. Van den Bergh test gave a faintly positive direct delayed reaction and a positive indirect reaction. The serum contained 2–3 units of bilirubin. The fæces contained bile-pigment and the urine contained urobilin but no bilirubin or urobilinogen.

Radiographic examination.—All the bones show generalised rarefaction, with thinning of the cortex. The metacarpals show a slight degree of trabeculisation, but this is not definite in the other bones. The vault of the skull shows some thinning of the tables and the medulla is increased in width. Radiating spiculation is also seen.

OBSERVATIONS POST MORTEM

The patient died when an anæsthetic was being given for the purpose of transfusion. The following were the macroscopic and histological changes in the various tissues.

Macroscopic.—The skull bones were greatly thickened but so soft that it was possible to push a scalpel through with but little force. The skull itself was discoloured, being a light purple colour, whilst hard calcareous plaques were present. These were most marked in the occiput, being there about the size of a shilling, but smaller plaques were present in all the skull bones. The bony tissue of the femur was so thin that on cutting out a piece of it the shaft cracked across. There was a thin bony covering over dense dark red bone-marrow. The marrow was about the size of a pencil in thickness, was easily detached, and firm enough to be removed without breaking. Bony trabeculæ were eroded, and the inner plate of the shaft was quite smooth. The spleen weighed 3½ oz. but was not as large as had been suspected on clinical examination when the patient was first seen; the Malpighian bodies were small. Of other organs, the gut showed prominent Peyer's patches and hæmorrhages into the mucosa; the lymph glands, except for the tonsillar glands, were not enlarged; the liver was slightly large and a little pale; the kidneys were not fatty, whilst the heart, though pale and flabby, was not as much affected as was anticipated.



Red cell distribution curve showing broad base and high coefficient of variation.

A microscopical examination was made by Dr. R. W. Scarff and Dr. A. T. B. Goldsmith, of the Bland-Sutton Institute, who reported as follows:—

Bone-marrow.—The portion received for section shows a very marked hæmopoietic reaction. There are islands of hæmocytoblasts surrounded by erythroblasts. The majority of the latter have basophil cytoplasm, some are polychromatic, and a few are eosinophilic. There are comparatively few normoblasts and erythrocytes. Between these islands of erythropoiesis are a few myelocytes. The majority of these are eosinophil in type. There are a few polymorphonuclear leucocytes scattered throughout the marrow, and megakaryocytes are very numerous. In the portions sectioned there are very few capillaries visible, and fat cells are scanty. The changes are indicative of a marked erythroblastic reaction, with early maturation of the cytoplasm of the erythroblasts—i.e., a shift back to megaloblastic erythropoiesis.

The *liver* shows cloudy swelling. Free iron is present in small quantities, chiefly in the portal tracts and around the periphery of the lobule. The sinusoids are dilated and contain blood, with many nucleated corpuscles, some of which have eosinophil, others polychromatic, cytoplasm. These cells are present in the capillaries of other organs—e.g., stomach and kidney. There are no islands of hæmopoietic tissue.

Spleen.—The pulp contains nucleated red cells of megaloblast and normoblast type, and many megakaryocytes. There are also present numerous myelocytes—many of these again being eosinophil. No islands of erythropoietic tissue are present, and no "foam" cells.

Stomach.—There is some atrophy of the mucosa, and small follicles of lymphoid tissue are present in the submucosa, which is infiltrated by numerous eosinophil polymorphonuclears. Nucleated red corpuscles are present in the capillaries.

The kidney shows some cloudy swelling of the tubules, but no other definite abnormality.

The lymph glands show persistence of normal follicular structure. Nucleated red corpuscles are present in the capillaries, but there are no erythroblasts in the gland stroma.

The findings in the bone-marrow are similar to those described by Turnbull (1934) in the marrow from an English girl of 19.

COMMENT

Cooley's anæmia appears to be a definite clinical entity and is probably a blood dyscrasia appearing as a recessive in the Mediterranean races. It is therefore comparable to the sickle cell anæmia of the negroid peoples. The case described will provide an opportunity for further observation in that the mother is again pregnant and the infant after birth can be examined to determine whether it has also inherited the condition and, if so, at what age it is first evident. The patient herself did not respond to treatment with iron and a blood transfusion produced some definite improvement. At an attempt at a second transfusion the patient unfortunately died under the anæsthetic.

We would emphasise that though Cooley has clearly defined a disease entity the features do not express the concept of von Jaksch's anæmia as understood by modern English pædiatricians. Advances in hæmatology and clinical knowledge now prevent the inclusion of leukæmic cases in the von Jaksch category and the syndrome is no longer a convenient dumping ground for all the unexplained anæmias and splenomegalies of infancy. Von Jaksch's anæmia is a useful term even though the conception of it must be somewhat elastic. The term implies that in the opinion of the clinician and hæmatologist the prognosis is not hopeless—a feature emphasised by von Jaksch himself. In contrast to Cooley's group, there is not only this relatively favourable outlook if treatment with iron or transfusion is energetically pursued, but there is also no constant familial trait (twins with the condition have, however, been reported) and no bony changes other than those due to associated rickets—a by no means invariable complication. Von Jaksch's anæmia appears to be a subacute hæmolytic anæmia, probably the result of infection in which there is in addition to the red cell changes a definite reaction on the part of the leucoblastic tissue resulting in the appearance of myeloid cells in the blood.

This case of Cooley's anæmia was shown at the Royal Society of Medicine (section of disease in children) on May 25th.

We wish to thank Dr. J. D. Robertson of the Courtauld Institute of Biochemistry for his many investigations and for the trouble taken in providing us with normal control figures. We are also grateful to Dr. F. G. Nicholas for help with the radiological diagnosis.

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NON-SPECIFIC PROTEIN THERAPY IN ASTHMA

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The purpose of this paper is to supplement a previous one [1] written by Dr. Arthur Porter and one of us (T. S. N.), in which were recorded some effects of injection of proteins in cases of bronchial asthma. The protein therapy already described has been continued and further experiments along similar lines have been made.

A large number of apparently dissimilar substances have been used in attempts to relieve the condition of the asthmatic, with varying measures of success: bacterial vaccines; tuberculin; broth, as used by us and named "B.B.W."; peptone, as advocated by Auld; cow's milk; and sulphur. Van Leeuwen used a 0·5 to 1·0 per cent. suspension of sulphur in olive oil, giving 1 c.cm. intramuscularly. It was followed by a local and general reaction and an improvement in the asthmatical condition, and he considered it more reliable than milk. Autohæmotherapy and autoserotherapy have also been used. An interesting substance is the proteose described by Oriel.[2] In his last paper Dr. Oriel comments on the difficulty of finding, among the various substances used, the common factor that leads to the amelioration of the asthma. We also are seeking some light on this problem, for in it may be concealed the missing links in the story of allergy.

ANAPHYLAXIS IN ANIMALS AND ATOPY IN MAN

For many years it has been recognised that when an antigenic substance gains access to the blood the body seeks to protect itself by forming an antibody whose function it is to render the foreign substance innocuous. These antibodies at first circulate in the blood but eventually largely disappear, remaining in certain of the tissue cells. If, during the period of circulation of the antibodies, more of the antigenic substance reaches the blood, an interaction takes place which is not accompanied by any bodily disturbances. If the antibodies are sessile upon some protein molecule the reaction occurs in or on the surface of the cells, causing marked functional disturbances.[3]

A very similar though actually different condition, known as atopy, occurs in man.[4] It is an inherited hypersensitivity, or tendency to become hypersensitive to certain proteins. Its clinical manifestations are seen in asthma, hay-fever, urticaria, some forms of eczema, almost certainly migraine, and perhaps even epilepsy. The nature of the reaction is unknown but a histamine-like substance is formed. This substance may perhaps be liberated from the tissue cells [5] as a result of a change in the permeability of the cell envelope caused by an alteration in the colloidal state.[6] In passing, it is interesting to note that adrenaline, which is beneficial in atopic diseases, is a natural pharmacological antagonist to histamine.

THE COMMON FACTOR

If it were possible to bring about a *circulation* of antibodies (to the offending allergens) one would expect the sensitised cells to be consequently protected. There is experimental and clinical evidence to suggest that when the antibody-forming tissues—probably the reticulo-endothelial system of cells—are stimulated to form antibodies to a particular antigen, the response is frequently general as well as particular.[8 9 10] By this we mean that antibodies which were produced at previous dates in response to different antigens are produced again. Boyd [11] considers it probable that in non-specific protein therapy it is the cells of the reticulo-endothelial system which respond. This would offer a rational explanation of why injections of protein and substances which may stimulate antibody formation are beneficial. And the common factor may be, we suggest, the ability to knock off, as it were, the sessile antibodies.

Examples of intercurrent disease benefiting the main affection are not difficult to think of. It may act in a somewhat similar manner—e.g., malaria in general paralysis—and Clark states that chronic gonorrhœa has been successfully treated with typhoid vaccines. Other examples are seen in nature, as when the course of chronic disease is greatly improved after an acute illness. Lobar pneumonia has such an effect on asthmatics. It is, however, not easy to formulate an hypothesis that explains all these phenomena satisfactorily.

The reason why sulphur should be beneficial is not evident. One school of thought attributes the action to its colloidal state. Van Leeuwen's preparation consists of a suspension in oil. One would expect a colloidal preparation to be precipitated by the salts of the subcutaneous tissues or muscles. In this event, the substance is deposited in a very finely divided state and highly active form. One milligramme intramuscularly will give rise to a brisk hyperpyrexial reaction. The good results sometimes obtained by using colloidal sulphur in the treatment of other conditions are commonly held to be due to hyperpyrexial reaction, which is accompanied by certain blood changes. We have deliberately refrained from using pyrexia-producing doses. The actual dosage has varied between 0·5 c.cm. of a 1 : 10,000 to 1 c.cm. of a 1 : 1000 preparation. The most useful doses usually lie between 0·2 and 0·8 c.cm. of the latter strength.

We do not propose to discuss the metabolism of sulphur but would recall that sulphur plays an important part in some oxidative processes,[12] and that one of the body's chief ways of dealing with poisonous substances is by oxidising them to simpler constituents. The noxious substances indol, skatol, and phenol, formed in the gut, are, after oxidation, excreted in the urine combined with sulphur. Voegtlin has suggested that salvarsan acts by uniting with the glutathione of the spirochætes and arresting oxidation. The exhibition of sodium thiosulphate in salvarsan poisoning is recognised as a helpful proceeding. Though the reason for this benign action is obscure, it seems certain that the body proteins find freely available sulphur of the utmost assistance in certain protective reactions.

In addition to colloidal sulphur (which was kindly supplied by Messrs. Crookes Ltd. in the first place) we have used a protein of vegetable origin. It was a matter of some difficulty to obtain one that was freely soluble in water, so that it could be kept as a standard solution and diluted to our requirements. With the help of Mr. G. W. Spence, dispenser to the Brompton Hospital, success was achieved with the soya bean.[13] This preparation was used in a strength which should correspond approximately to the "B.B.W." So far the results obtained have not been very encouraging, but we have not yet subjected it to exhaustive tests.

RESULTS

The results of our recent work are published in the Tables appended. The cases have been divided up, this time, into degrees of severity: (1) mild; (2) moderate; (3) severe. This grading is only relative because, before any case is admitted to the clinic, thorough trial has been made with the usual medicaments, dietary and hygienic advice offered, and any desirable operative measures that would correct defects of the upper respiratory tract performed. Group 1 includes those who get attacks several times yearly, sometimes lasting for weeks but with fairly long free intervals intervening. Group 2 includes those who have been getting severe attacks monthly, or more often, frequently associated with nightly bouts of "tightness" of the chest. Group 3 includes those who have been getting severe attacks weekly, or even daily, sufficient to interfere with occupation and comfort.

The results have been put into four classes, as before, marked A, B, C, and D. "A" signifies very much improvement. The patient is practically free from any attacks and those which may occur are milder in character and shorter in duration. "B" signifies much improvement. The attacks are definitely less in frequency and milder in type and duration. The patients express themselves as being "much better since the injections." "C" means improvement. There is definite diminution in the frequency of the attacks and/or lessening of severity, but troublesome bouts persist. Commonly it is the character of the paroxysm which is altered. Nightly spasms are common. "D" means no improvement whatever.

TABLE I

General Results in 46 Cases of Asthma

Explanation of grouping is given in the text

	A	B	C	D	Total Nos.
1 ..	4 ..	1 ..	— ..	— ..	5
2 ..	7 ..	9 ..	7 ..	— ..	23
3 ..	4 ..	5 ..	8 ..	1 ..	18
Totals ..	15	15	15	1	46
Per cent. ..	32·6	32·6	32·6	2·2	100

A striking feature is the regularity with which the majority of patients attend for prolonged periods. If, after the first few injections, a patient is not improved he or she would be expected to stop coming. This has happened in a few instances but the majority persevere until an effective dose and preparation have been found. The multiplicity of substances used is not necessarily a confession of the inadequacy of any particular one. Some people respond to one substance better than others, and vice versa. Table II. shows that "B.B.W." holds the first place therapeutically. Colloidal sulphur is promising and forms an interesting addition to our armamentarium. The number of cases treated with soya bean is so far too small to justify a conclusive opinion.

The cases treated with autogenous vaccines need an explanatory note. We have long held the opinion that one of the types of asthmatic most resistant to treatment is that in which the patients are hypersensitive to catarrhal organisms, usually of streptococcal type. These people carry their own provocative agent about with them and require only a trivial exciting cause to precipitate an attack. It is interesting to note that Knott and Oriel have detected histamine-like substances in asthmatic and other sputa[11] and suggest a bacteriological origin. These possibly histamine-producing organisms, when situated in the bronchioles, might well cause asthma by liberating histamine in situ. These people are very sensitive to cold air, which seems at once to cause an attack. They are intensely sensitive to injections of autogenous vaccines administered in normal therapeutic doses; in fact, a very alarming reaction may be caused. Our vaccines are well diluted and we commence with very small doses. The results are not particularly good but better than those obtained with other agents in this class of case.

TABLE II

Results with Various Remedies

	A	B	C	D	Total Nos.
			COLLOSOL SULPHUR		
1 ..	— ..	— ..	— ..	— ..	—
2 ..	1 ..	6 ..	6 ..	— ..	13
3 ..	2 ..	4 ..	5 ..	2 ..	13
Totals ..	3	10	11	2	26
Per cent...	11·6	38·4	42·3	7·7	100
			BROTH B.B.W.		
1 ..	3 ..	1 ..	— ..	— ..	4
2 ..	4 ..	5 ..	9 ..	1 ..	19
3 ..	2 ..	4 ..	5 ..	2 ..	13
Totals ..	9	10	14	3	36
Per cent...	25	27·8	38·9	8·3	100
			SOYA BEAN		
1 ..	— ..	— ..	— ..	— ..	—
2 ..	— ..	— ..	2 ..	— ..	2
3 ..	1 ..	1 ..	3 ..	1 ..	6
Totals ..	1	1	5	1	8
			S.U.P. 36		
1 ..	— ..	— ..	— ..	— ..	—
2 ..	— ..	— ..	1 ..	1 ..	2
3 ..	— ..	— ..	1 ..	4 ..	5
Totals ..	0	0	2	5	7
			AUTO-VACCINES		
1 ..	1 ..	— ..	— ..	— ..	1
2 ..	1 ..	1 ..	— ..	— ..	2
3 ..	— ..	— ..	1 ..	— ..	1
Totals ..	2	1	1	0	4
			TUBERCULIN		
1 ..	— ..	— ..	— ..	— ..	—
2 ..	— ..	— ..	2 ..	— ..	2
3 ..	— ..	1 ..	1 ..	— ..	2
Totals ..	0	1	3	0	4
			PEPTONE		
1 ..	— ..	— ..	— ..	— ..	—
2 ..	— ..	— ..	— ..	— ..	—
3 ..	— ..	— ..	1 ..	1 ..	2
Totals ..	0	0	1	1	2

Besides these results, obtained from cases attending the Brompton clinic, we have reports from various practitioners in different parts of the country who have been using "B.B.W." for a number of years with encouraging results. Experience is required to obtain the best results, and correct dosage is essential. Where failure has been reported we have often detected some error in size of dose. In one case we were able to permit the patient, a man of intelligence, to administer "B.B.W." to himself. The result has been most satisfactory, particularly in view of the fact that it was a very bad case and had failed to respond to other therapy. The injections are usually given weekly or fortnightly.]

SUMMARY

(1) We confirm our previous conclusion that protein injections are markedly beneficial in asthmatics. (2) Colloidal sulphur produces good results and its addition to our therapeutic weapons is justified. Our best results have been obtained with "B.B.W." (3) We reassert that the treatment forms a short-time prophylaxis. (4) We suggest that the common factor, which various apparently dissimilar substances possess, of causing good effects in asthma may be the property of reawakening the antibody-forming tissues to produce and circulate antibodies; a particular stimulus causing a general as well as a particular response. (5) There seems to be a strong probability that the hypersensitivity, or tendency to develop hypersensitivity, is inherited as a Mendelian dominant character. Thus the prospect of absolute cure of atopy is a little gloomy.

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Clinical and Laboratory Notes

A CASE OF ANÆMIA

BY KENNETH M. MACLEOD, M.R.C.S. Eng.

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A MAN, aged 33, a fried-fishmonger by trade, was admitted to the Hampstead General Hospital on Jan. 25th, 1933, complaining of painful swelling of the left knee for the past ten days. There was no history of injury. The swelling had been aspirated by his doctor on the evening before admission and fluid resembling blood was understood to have been withdrawn.

CLINICAL RECORD

Past History.—Penile sore 14 days before admission (Wassermann reaction negative). Facial abscesses during latter part of previous autumn. All teeth extracted before Christmas, 1932. His wife and friends had noticed that he was getting paler since the previous October (1932). No other serious illness.

Family History.—Married 8 years; wife healthy, no children. Father died, aged 49, of "tumour of liver." Mother died, aged 56, of aortic disease with infective endocarditis. No sisters or brothers.

Condition on Admission.—Temp. 98° F., pulse-rate, 92, resp. 20. A pale, thin man, rather toxic looking, but colour of lips and ears good. Edentulous. Gums apparently healthy and no evidence of gingivitis. Throat, heart, and lungs: nothing abnormal found. Blood pressure: 120 systolic, 70 diastolic. Obvious swelling (apparently superficial) of the left prepatellar region, with blue discoloration of the overlying skin. Joint movements somewhat limited but patently no involvement. The superficial subinguinal glands were enlarged and tender on the left side. On the right there was one enlarged tender gland with some reddening of the overlying skin.

On the evening of admission the skin over the left prepatellar region broke down, allowing drainage of a thin, watery, blood-stained "pus," and leaving a discharging sinus (culture of this fluid revealed hæmolytic streptococci). Blood culture was negative.

Investigations.—On Jan. 27th a blood count showed:

Red cells ..	.. 2,676,000	Polymorph	36%
White cells	.. 3,200	Lymphocytes	53%
Hæmoglobin	.. 62%	Path. large lymphocytes	8·5%
Colour-index	.. 1·1	Hyaline	2·5%

The report was as follows: "Anisocytosis and poikilocytosis are slight but there are a number of obvious megalocytes and the average size of the red cells is considerably increased. There is considerable polychromatophilia. In counting 200 W.B.C. there were seen: 15 normoblasts, 10 macronormoblasts, and 7 megaloblasts. 14 per cent. of the polynuclears are 'band' forms. Platelets are probably reduced but not very markedly so. A very unusual picture, but, on the whole, more like aleukæmic lymphatic leukæmia than pernicious anæmia."

Gastric analysis (without histamine) on Feb. 2nd showed no significant abnormality, fractions obtained at 20 minutes' intervals giving the following results:

	Free acid. (Both as c.cm. of N/10 HCl %.)	Total acidity.
Residuum	0	20
Specimen 1	0	16
„ 2	22	40
„ 3	30	50
„ 4	25	40
„ 5	40	54
„ 6	52	62
„ 7	50	60
„ 8	—	—

Continued secretion masked by regurgitation: emptying time rapid, the meal being nearly all out by tube No. 4. Starch: absent in fasting; trace in No. 6; + + in remainder. Occult blood: trace in fasting. Bile tinge: + in all except No. 2; strongest in Nos. 5, 6, 7. Mucus: + + in fasting; + + in Nos. 1, 2; trace in remainder.

Both Wassermann and Meinicke reactions were negative Van den Bergh reaction: direct test, negative; indirect. test, 1 (i.e., slightly increased). A fragility test (April 11th) showed no excessive fragility of the red cells, the figures being:

% strength of salt solution.	% of hæmolysis.	% strength of salt solution.	% of hæmolysis.
0·50	0	0·38	50
0·48	0	0·36	78
0·46	2	0·34	95
0·44	5	0·32	99
0·42	8	0·30	100
0·40	15		

Course of Illness.—Iron (ferr. redact. grs. 30 t.d.s.) and liver extract were given for a month, with but little change in the patient's general and local condition. His blood picture, however, revealed a steady and progressive deterioration. On Feb. 23rd it was:

Red cells ..	.. 1,880,000	Polymorph	41%
White cells	.. 4,400	Lymphocytes ..	57·5%
Hb. ..	.. 38%	Hyaline	1%
C.I.	.. 1	Eosinophil	0·5%

"Marked anisocytosis and poikilocytosis and polychromatophilia. Some punctate basophilia. In counting 200 W.B.C., 51 normoblasts and 15 macronormoblasts were seen. 16 per cent. of the polys are 'band' forms. The average size of the R.B.C. is normal." There was no appreciable pyrexia but his pulse-rate varied between 70–90.

On Feb. 25th I did a bone-marrow "puncture." Under local anæsthesia a small portion of red marrow was obtained from the upper end of the right tibia, and the following report came from the pathologist: "Macroscopic: marrow partly fatty. Smears: no organisms seen. Films: mostly red cells, a few nucleated but no obvious megaloblasts; white cells are rather scanty; lymphocytes appear to be more numerous than usual but they seem normal. Cultures remain sterile after six days' incubation. Histological examination of cut sections: the marrow shows no evidence of erythroblastic, megaloblastic, or leucoblastic reaction, the blood-cells present being probably of operative origin."

On Feb. 27th a transfusion of 500 c.cm. of citrated blood was given, with considerable temporary improvement.

This however was not maintained in spite of supplementation with Hepatex intravenously, and reduced iron. In the meantime the left inguinal glands began to break down, producing a small amount of blood-stained "pus" in which were found some degenerated polynuclear and lymphocytic cells—but no organisms either in film or culture. The infected knee at this time appeared to be slowly healing and epithelialising, but still looked unhealthy.

Blood transfusions were given subsequently at weekly intervals until the general and local condition seemed quite fair. His hæmoglobin rose to 70 per cent. and the red cells to 4,300,000, but his white cells remained low, at one time dropping to 800 (56 per cent. polymorph and 38 per cent. lymphocytes). Pentose nucleotide injections improved the leucopenia somewhat but proved too harassing for the patient and had to be discontinued. The blood transfusions were then stopped to see if the improvement would be maintained, but unfortunately it was not, and his hæmoglobin and red cells progressively diminished in spite of iron, arsenic, X ray therapy, liver, and antistreptococcal serum until May 26th (when he took his own discharge) at which time his hæmoglobin was 32 per cent., red cells 1,640,000, and white cells 1800.

Between May 26th and June 27th (when he was readmitted to hospital) he was seen in the out-patient department at weekly intervals, and was obviously going downhill rapidly, with urgent dyspnœa, anginal pain, and epistaxis. He finally yielded to persuasion and was readmitted. At this time his blood was as follows:—

Red cells	730,000	Polymorph	29 %
White cells.. ..	5,200	Lymphocytes ..	59 %
Hb...	17 %	Hyaline	12 %
C.I.	1·1		

"A fair amount of anisocytosis (including some megalocytosis), poikilocytosis, and polychromatophilia. The average size of the R.B.C. is slightly increased. Platelets are present in moderate numbers. There are about twice as many nucleated R.B. cells as there are W.B.C. They include normoblasts, microblasts, macronormoblasts, megaloblasts, and an occasional gigantoblast. Some of the cells classified as lymphocytes have the appearances suggestive of lymphoblasts."

On admission the temperature was 99° F., the pulse-rate 120, and the respirations 32. He was urgently dyspnœic and looking very ill. He was transfused twice without very much improvement, had numerous epistaxes, developed a terminal pneumonia, and died on July 14th.

OBSERVATIONS POST MORTEM

Macroscopic.—Pale, rather thin body. Numerous necrotic areas in both inguinal regions and left knee. The tonsils were not very large but contained pus. Terminal local broncho-pneumonia. Heart showed petechial hæmorrhages under the visceral pericardium of the right auricle, pulmonary artery, and commencement of aorta. There were also numerous white points of pin-head size, surrounded by a red areola, under the endocardium of both auricles and ventricles (especially on the right side). Liver: showed one or two parenchymatous, subcapsular white areas, similar to those in the heart. Spleen: slightly enlarged (8½ oz.); rather pale and soft. Kidneys: somewhat large and pale; capsules strip easily. Suprarenals: normal. Marrow (upper end and shaft of humerus): pink.

Microscopic.—Examination of the *marrow* revealed only leucoblastic and erythroblastic activity—not abnormal in type. Sections from the broken-down glands showed caseous areas surrounded by large, swollen (probably endothelial) cells, fibroblasts, and an occasional giant cell. No tuberculosis or other organisms seen. No obvious endarteritis or peri-arteritis. The *kidney* section showed some cloudy swelling and a subcapsular area consisting of Gram-positive cocci (probably in a glomerulus) surrounded by a necrotic tissue containing mononuclear cells and outside this a hæmorrhagic zone. Organisms were not seen beyond the central mass. The *liver* showed some central zonal necrosis with some periportal round-cell infiltration. A small subcapsular area of degeneration with polymorphs and mononuclear cells—probably the edge of structure similar to that seen in the kidney. No organisms could be found in it. *Spleen:* rather bloodless; reduction in Malpighian bodies, and some excess of polymorphs. *Heart:* the section unfortunately missed all of the pin-point areas, but what was probably the edge of one showed a mononuclear infiltration; Gram-positive cocci and Gram-positive bacilli are present. The *tonsils* showed heavy streptococcal infection of the crypts, spreading into the gland substance; mononuclear reaction only. A *cœliac gland* showed reduction in the number of lymphocytes with apparent increase of reticulum cells and endothelial cells. A *cervical gland* showed the same changes.

Thursfield[1] states that "wherever there is, even in the absence of a leucocytosis, a predominance of abnormal cells, whether these be myelocytes or 'lymphocytes,' to the extent of 25 per cent. or over, of the total, the disease is leukæmia." This definition, however, would include the group of cases described by Turk as examples of the "lymphatic reaction," which are commonly associated with sepsis. In the case described one cannot say with certainty which preceded the other, the sepsis or the hæmoblastosis; but it seems likely that the septic focus was the originator of the blood changes.

A study of the blood counts indicates that there was no failure on the part of the blood-forming organs to produce cells; in fact, there was every indication of excessive activity (numerous immature red cells, "shift to the left" of the polymorphonuclears, and erythroblastic and leucoblastic activity of the bone-marrow). This suggests that either these cells never reached maturity or (what appears more likely) that they matured but degenerated or were destroyed. This is borne out by the results of the van den Bergh test. Furthermore, the leucopenia was in the nature of an hypogranulocytosis; the total number of lymphocytes was diminished hardly at all, whereas the total number of *mature* polynuclears was reduced extremely. It is interesting to note in this connexion that one of the usual features of agranulocytosis—namely, necrotic, non-suppurative ulceration—was present in this case throughout the period of observation. The absence of any appreciable pyrexia throughout the entire course of the illness is, I think, remarkable.

Pathological examination of the lymphatic glands and reticulo-endothelial structures does not shed much light upon the ætiology of the condition, although it is suggestive of a circulating infective process.

I should like to express my indebtedness to Dr. C. Rickword Lane, who was responsible for the pathological investigations, to Dr. A. J. Scott Pinchin for permission to publish the case, and to Dr. Vincent Smith, my predecessor, some of whose notes I used freely.

A RADIOPAQUE CONCRETION IN THE APPENDIX

BY DAVID LEVI, M.S. Lond., F.R.C.S. Eng.
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A. B., aged 19 years, a patient of Dr. P. W. Boobbyer's, had enjoyed good health till 18 months ago. He first noticed pain below the right costal margin. The pain radiated down the right leg and was accentuated by exercise. There was no nausea or vomiting. The bowels were regular in their action, and there were no other urinary symptoms. The attack of pain lasted a week and then passed away. Recently the attacks have been coming on more frequently.

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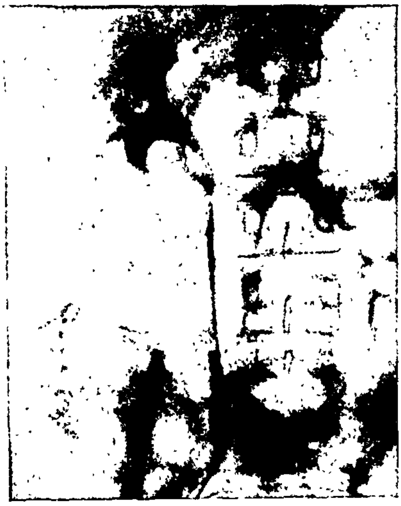
[1] Thursfield, J. H., in Price's Text-book of Medicine, London, 1929, p. 721.

On March 6th, 1934, he had another attack of epigastric pain which settled in the right loin. Again there was no nausea or vomiting and the bowels were regular. The patient was seen for the first time on March 7th when he had tenderness high over McBurney's point and in the right loin. There was a little rigidity of the muscles of the right loin. On an X ray examination of the urinary tract Dr. H. Courtney Gage reported as follows: “Shadow right side just below iliac crest. It appears in the lateral view behind the anterior border of the bodies of the vertebræ—very suggestive of a stone in the lower pole of the right kidney, but should be confirmed by pyelography or excretion urography if operation is contemplated. There is too much gas in the colon to show the kidney shadows.”



Pyelogram showing circular shadow outside the urinary system.

A pyelography was then performed and this demonstrated (see Figure) that the shadow was outside the urinary system. The patient developed more acute symptoms which pointed to the appendix, the abdomen was opened, and an acutely inflamed appendix lying in the external paracolic sulcus was removed. The appendix was a very long one, and its tip was attached to the lower pole of the right kidney. When the appendix was opened it was found to contain a concretion. On examination this concretion was found to be composed of almost pure $Ca_3(PO_4)_2$. Dr. Roche Lynch kindly analysed the concretion, and his report is as follows: “Traces of organic matter. Traces of $(COO)_2Ca$. No uric acid. But the rest—i.e., practically all—$Ca_3(PO_4)_2$.”

The patient made an interrupted recovery, and on subsequent X ray examination the shadow had disappeared. This case is briefly recorded because of the rarity of a calcium phosphate fæcalith. The appendix and stone are in the St. Mary's Hospital museum.

ENCEPHALITIS AND POLYNEURITIS DUE TO PREGNANCY TOXÆMIA

By Theodore Brocklehurst, M.R.C.S. Eng.

Korsakoff's psychosis associated with pregnancy is sufficiently rare to warrant publication of a severe case. The rapid improvement which followed termination of the pregnancy was so striking as to leave no doubt of the association of the two conditions.

The patient, then a woman of 23, first came under my care in April, 1933, immediately after her return to this country, and the following record is based largely on reports and case notes made by medical officers in India, which have been forwarded for my information.

The family history was normal. During childhood the patient had the usual complaints; in 1927 her appendix was removed and in 1928 she had herpes zoster. For years there had been occasional migrainous headaches associated particularly with menstruation, but there had never been any vomiting or eye symptoms with them. There had been dysmenorrhœa for some years, and, since her marriage, vaginismus and dyspareunia.

The first pregnancy started two years after marriage, but miscarried at the end of the second month. The second started three years after marriage, in March, 1932, while she was with her husband in India; she was very anxious to have a child. In April nausea and vomiting commenced and she was forced to take to bed. The vomiting occurred several times daily and she could retain no solid food. She was extremely weak on her legs and could not be persuaded to eat; but this anorexia and vomiting which continued until July was probably partly due to psychological causes, for she had been told alarming tales of her mother's first pregnancy. During this time the temperature was normal except for two brief periods when it reached 103° F.

In June, 1932, a retroverted gravid uterus was diagnosed, and an attempt to correct this under anæsthesia was made. Shortly afterwards she was moved into another hospital in India, and then the toxic affection of the nervous system became manifest. Her legs became extremely weak, but the arms less so, as she was able to pull herself up in bed: her deep reflexes were all absent but her sensations were reported on as normal. Then at the end of July her memory for recent events began to fail, so that although she was able to recognise friends she had not seen for three or four years, she was not able to tell where she was, and could not recall the events of the previous day. Her talk and behaviour became foolish, and she fabricated accounts of where she was and what she had been doing. Throughout she was able to recognise her husband. She repeatedly moved her head from side to side and had a vacant stare.

At this time nystagmus was recorded. For some weeks in July and August she was incontinent of urine, and for some days a temporary aphasia was noticed; also there was failure of accommodation of near objects. At no time was there more than a slight headache, and there was no photophobia or diplopia. At this time shock therapy with T.A.B. vaccine was tried, but without benefit.

The vomiting had ceased at the end of July, but the patient continued to take very little food. Her mental condition improved slightly with the cessation of vomiting, but deteriorated gradually again later. The drowsiness, the mental condition, and the weakness of the limbs became progressively worse, and her general condition became so critical (she lost weight from 10 st. to 5 st.) that at the end of October it was decided—much against her wishes—to terminate the pregnancy. Within two days her mental condition was noticeably improved; she steadily gained in strength, and her mental condition was such that by Christmas Day, 1932, she was able to converse freely with her husband and eat a good Christmas dinner.

Between April and October, 1932, various investigations were performed. The urine never contained more than a trace of albumin, and no pus or micro-organisms. The stools contained no ova, cysts, or pathogenic micro-organisms. In August the blood count was normal, the Wassermann and Kahn reactions in the blood were negative, and no agglutination to *Brucella melitensis* or *abortus* occurred. The cerebro-spinal fluid showed normal cell and protein values. In October the urea-concentration test at two hours showed a result of 3·4 per cent.; at this same time her muscle reactions showed no definite reaction of degeneration, but all the leg muscles gave a sluggish response to faradism.

At no time had there been a craving for, or opportunity to obtain, alcohol; and there was no suggestion of a diphtheritic infection.

When the patient came under my care in April, 1933, she was still emaciated, and had a partial amnesia for the events of her illness. On examination, apart from her emaciation, the only abnormal physical signs were found in the nervous system. Her speech was rather slow, but otherwise her mental powers were normal. The cranial nerves were all normal, apart from a little pallor of the optic discs. The trunk muscles were weak but not markedly so. The arms showed general weakness and wasting, particularly in the small muscles of the hands; and the only deep reflex obtained was a slight response in the left triceps. The legs showed a more marked degree of muscular weakness and wasting, particularly in the muscles below the knees, and there was complete inability to correct foot-drop. The ankle-jerks were absent but a slight response was obtained in the left knee-jerk on reinforcement. The abdominal reflexes were absent and the plantars both extensor. The deep sensations were all present and normal, including vibration sense, although the calves were excessively tender. The superficial sensations were diminished peripherally: the patient had noticed when she was having massage that she was unable to feel clearly below the ankles, and with a dragged pin and to heat and cold there was progressive diminution of sensation of glove and stocking distribution, below the elbows and knees.

With massage, faradism, and re-educational exercises the patient continued to improve, so that by November, 1933, she was able to walk with the aid of sticks, her deep reflexes were showing evidence of return, and her plantars flexor.

This patient was seen in consultation with Dr. E. C. Warner in July, and with Dr. Gordon Holmes in August, 1933. They agreed with the diagnosis and gave an excellent prognosis, which has proved correct, as the patient is now able (September, 1934) to lead a normal life. The reflexes and superficial sensations are now normal. The patient's husband having died, the question of further pregnancy does not arise.

Bexhill-on-Sea.

MEDICAL SOCIETIES

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION

On Sept. 14th and 15th this association held a jubilee meeting at Eastbourne, various social functions being arranged as well as a discussion, over which Dr. J. A. H. Brincker presided.

Acute Streptococcal Throat Infections

Dr. J. Alison Glover, of the Board of Education, opened the discussion, reading a joint communication by himself and Dr. Fred. Griffith of the Ministry of Health. Dr. Glover explained that no school would be named, as it was important to preserve the confidential character of the information which the Ministry had at its command. These throat infections, he said, were a constant source of trouble and anxiety to both headmaster and school medical officer. The primary and most prevalent streptococcal disorder was acute tonsillitis, an endemic and epidemic infectious disease with an incubation period of two to four days, whose main incidence was at puberty. Infection could be conveyed by milk, tableware, handkerchiefs, pencils, and by droplets from the nasopharynx. Transmission by milk had resulted in many severe outbreaks in different parts of the world, but in schools the chief means of spread was by droplets. With the exception of infection with the Klebs-Löffler bacillus, acute tonsillitis was almost invariably due to hæmolytic streptococci. The annual attack-rate for the navy in 1932 was 2·7 per cent.; at Guy's Hospital Close found that 6·7 per cent. of all patients attending the out-patient department for the first time attended on account of this infection. Captain S. F. Dudley found at Greenwich Royal Hospital School an attack-rate of 4·8 per cent. per term. The disastrous effects of the malady were due to the serious complications which often followed it, such as otitis media, mastoiditis, meningitis, septicæmia, and pneumonia; rarer sequelæ were acute rheumatism and nephritis. One of its greatest dangers was its concurrence with outbreaks of measles. For many years it had been known that cases of tonsillitis without rash occurred during an epidemic of scarlet fever side by side with cases having the usual rash fully developed. In 1887 Mantle drew attention to the close alliance of the conditions found in epidemics of sore-throat and of scarlatina, and this had been confirmed by the serological work of Dr. F. Griffith. It seemed clear, indeed, that acute tonsillitis and scarlet fever, apart from the presence of a rash and the possibly greater risk of nephritis in the latter disease, were almost identical, both bacteriologically and epidemiologically. Hæmolytic streptococci in the throat were capable of producing varying clinical pictures in different persons, these differences being often seen in different boys in the same dormitory: one boy might show nothing more than a healthy carrier state, another a feverish pharyngitis, another a definite tonsillitis, a fourth scarlet fever. In a certain proportion of the healthy community the *S. pyogenes* was always found, the actual proportion varying with the locality and the season, as well as with the hygienic surroundings. This healthy carrier-rate varied greatly, and in residential schools it was as a rule probably somewhat higher than elsewhere. During epidemics of tonsillitis this carrier-rate might become very high. Investigation seemed to show that certain serological types of the pyogenes group were specially equipped to produce the complete scarlet fever syndrome. Members of the profession as well as the laity were still inclined to regard an epidemic of scarlet fever in a school as merely the occurrence of a number of cases of a well-defined clinical type; and to devote attention to tracing the spread from case to case, believing that isolation of all suspected cases would check the progress of the epidemic. Sometimes this attitude seemed to be justified; but often the matter was much more complex, especially when the infecting strain was of low toxigenicity and part of the school population was Dick-immune. In one term at a large public school there were many cases in a mixed epidemic of this kind, with 43 cases of pharyngitis, 101 of tonsillitis, and 16 of otitis media. Yet there were only 4 cases of rash, none of which were considered to be scarlet fever. The causal organism isolated from a considerable number of these cases justified the view that the whole of that epidemic was due to Type 1 scarlatinal streptococcus. In this outbreak, also, a change of clinical type was seen. Dr. Glover showed diagrams illustrating the incidence and clinical type of cases, correlated with the serological type of infecting streptococcus in epidemics in nine schools.

Otitis media was a cause of great anxiety to school doctors; most often it followed tonsillitis, influenza, scarlet fever, or measles. Probably at least three-fifths of the cases of otitis media in schools were due to hæmolytic streptococci. Not only was the ear condition dangerous in itself, but Macleod Yearsley had stated that 29 per cent. of acquired deafness was due to otitis after measles, and 34 per cent. to otitis following scarlet fever. Dr. Glover considered, however, that owing to the higher age grouping, tonsillitis in the public school was a much more common cause of otitis than either measles or scarlet fever. The importance of dormitory infection in producing such sequelæ as otitis media was suggested by the fact that, whilst the incidence of tonsillitis, measles, and influenza during the four years 1930 to 1933 was substantially the same in the case of the boys and of the girls in well-to-do public boarding schools examined by the Medical Research Council in its inquiry into epidemics in schools, the incidence of serious complications due to streptococci and pneumococci was shown to be significantly lower in the case of girls. It was suggested that among the causes of the difference were the greater care given to girls, their superior discretion when ill, and their better nutrition ; but Dr. Glover believed that the main reason for the beneficial difference was that nearly all the girls slept in large and well-ventilated cubicles whilst most boys slept in dormitories, many of rather antique design. On the question of whether the occurrence of otitis had a definite relation to the use of swimming baths, Dr. Glover said that, while he was a strong advocate of pure water for baths, it was found that the highest incidence of otitis media in schools occurred in the Lent term, when little swimming was done. Acute rheumatism among well-nurtured children of public schools was a much less common complication of tonsillitis than was otitis media ; it seemed to require a further, an unknown, factor in addition to the throat infection to set up acute rheumatism. Possibly this other factor was some vitamin deficiency.

PREVENTION

Epidemics of tonsillitis usually indicated, Dr. Glover submitted, the existence of unsatisfactory hygienic conditions in the establishment, either in the school itself, or in the sick room or sanatorium. Epidemics of tonsillitis or the occurrence of droplet cases of scarlet fever or otitis media in schools were generally associated with a high carrier-rate of hæmolytic streptococci ; and, again, epidemics of tonsillitis or otitis and high carrier-rates of hæmolytic streptococci were, usually, signs of the existence of environmental conditions favourable to a rapid transmission of infection. It was very important to keep carrier-rates low. In most school epidemics the infection was wafted in droplet form from one nasopharynx to another in dormitory, class-room, common-room, changing-room, dining-room, tuck shop, and church. Of these the dormitory seemed to be the most important, for in it there was undisturbed proximity of the healthy with the infected for a number of hours on end, and infectivity was heightened by closure of doors, and, in bad weather, of windows. The Board of Education had laid down and required for 20 years the following spaces : for dormitories at least 3 ft. between beds, and a floor area per bed of not less than 65 sq. ft., and a cubic space per bed of 700 cu. ft. Ventilation must be adequate and "through," windows being on opposite sides of the room. For cubicles, if partitions were not carried to the ceiling, 65 sq. ft. and 700 cu. ft. were adequate ; when partitions were carried to the ceiling, 100 sq. ft. and 1000 cu. ft. were required, and for sick rooms not less than 6 ft. between beds and a window between each two beds.

The placing of beds heads to tails did not appeal particularly to Dr. Glover. It was extremely dangerous to overcrowd the sanatorium when a school was visited by an epidemic ; patients should be separated by not less than 6 ft.

Dr. Glover said he was unable to deal with prophylactic immunisation owing to lack of time.

Discussion

Dr. L. R. LEMPRIERE (Haileybury) stressed the great anxiety which these epidemics caused to the school medical officers. His impression was that they were recently on the increase. It was difficult to know how to prevent these outbreaks ; medical officers would be only too glad to keep down the carrier-rate if they could. The general hygiene of public schools had improved to a remarkable extent, but he doubted whether the internal hygiene of the public school boy had improved much, notably the attention paid to keeping his nose clean. Scarlet fever had definitely diminished in schools. Where there was a large total of septic cases there was usually a clay soil.

The MAYOR OF EASTBOURNE (Mr. G. Thornton) thought bathing had much to do with the occurrence of otitis media, whether the bathing were in public baths or in the sea. In his school he thought morning and night gargling as a routine had much to do with its freedom from serious infections.

Mrs. LILIAS M. JEFFRIES (Roedean) agreed as to the danger of otitis following bathing. For sleeping she favoured the cubicle system, though she was not able to say that this reduced the amount of nasopharyngeal disease in comparison with that found in dormitory sleeping. Many dormitories were very imperfectly ventilated. She did not think the importance of consuming only milk which had been pasteurised was sufficiently stressed.

Dr. W. G. WILLOUGHBY (M.O.H. for Eastbourne) also thought that epidemics of throat infections in schools seemed of late to be on the increase ; serious mixed infections, indeed, seemed to have practically dated since the war. At the same time, the cases of scarlet fever were less severe now than formerly. It was of little importance to insist on a certain minimum cubic space unless the air was frequently renewed. He thought the window space in living rooms should be one-tenth the floor space, and that half the window should be openable. He agreed with daily gargling, but deprecated indiscriminate nose syringing. In Eastbourne the policy of thorough isolation in suspected scarlet fever cases had been most successful. He asked as to the possibilities of producing a serum for protecting school communities against these throat infections.

Dr. W. H. BRADLEY (Downside) said his school experience had taught him that overcrowding was the most important factor in the spread of streptococcal diseases. Since circumstances had reduced the population of a particular school and had thus made possible a more generous spacing for each boy, the medical officer had had little to do. He urged medical officers to keep a careful watch on the behaviour of cases of disease, especially as the clinical picture varied so much.

Dr. E. H. R. HARRIES (London) said that from the throats of a large number of children sent into the North-Eastern Fever Hospital with definite clinical scarlet fever a pure culture of hæmolytic streptococcus was obtained. He urged this testing as an early bacteriological aid in doubtful cases ; naked-eye evidence of hæmolysis was quickly obtained. In his hospital it was used as a routine. Recent work separating the hæmolytic from the toxigenic properties of the pyogenes was very valuable. He attributed the rarity of secondary infections at his hospital to the insistence on at least 12 ft. of wall space for each patient. The use of scarlet fever antitoxin was worth while, even in mild cases ; it certainly reduced the complication-rate.

Dr. E. KAYE LE FLEMING (Canford School, Wimborne) considered that the great problem awaiting solution was wherein lay the resistance of the individual to the streptococcus, why it was lost, and how it could be regained. Overcrowding he regarded as more important than bathing. He thought the open-air dormitory would solve 90 per cent. of these epidemic troubles, but both parents and headmasters required educating as to the value of this plan. He would like to see an illness chart drawn up by the association, in collaboration with the Ministry of Health, for use in schools.

Dr. R. E. SMITH (Rugby School) contended that much could be done to render scarlet fever a preventable disease, and parents should be told of the possibilities in this direction. As to bathing, boys should be told never to jump into the water unless they at the same time held their nose. Many young boys had not achieved immunity against scarlet fever, and parents should see that their sons had been so immunised before sending them to a public school.

Dr. W. ATTLEE (Eton) urged that some revision of the present quarantine rules should be made, as it was a needless waste of time to insist upon quarantine for such conditions as rubella. He agreed with all that had been said as to the importance of avoiding overcrowding. Separate sleeping rooms was the system at Eton, and not more than two or three cases of hæmolytic throat infection were seen at one time; there was no general spread. More efficient ventilation in schools should be accompanied by sufficient heating of the rooms.

The PRESIDENT held that improvement in the personal habits of boys would do much to lower the carrier-rate of these diseases. He agreed with Dr. Attlee's remarks on quarantine regulations. He spoke of the immunisation of nurses in the L.C.C. service, but said that there was not the same certainty yet in the matter of scarlet fever as in diphtheria.

REVIEWS AND NOTICES OF BOOKS

The Legal Aspect of Industrial Diseases

By C. H. SPAFFORD, of the Middle Temple, Barrister-at-Law. London: Butterworth and Co., Ltd. 1934. Pp. 273. 21*s*.

UNDER the various Workmen's Compensation Acts in this country the employer is compelled to pay compensation to a workman who may be incapacitated from earning "by reason of an accident arising out of and in the course of his employment." In order to prove an accident, however, there has to be definite evidence of trauma. It was recognised soon after their passing that the wording of the Acts did not afford a workman such full protection a was originally intended. Incapacity for earning was frequently found to be due to a disease peculiar to the work in which a man had engaged; his incapacity therefore, although not due to an accident, nevertheless "arose out of and in the course of his employment." Attempts were then made to grant the necessary protection by issuing schedules of industrial diseases so that a workman suffering from any of the named diseases could claim compensation.

Much confusion of thought has arisen from attempts to interpret the law of disablement from "industrial diseases" in terms of an "accident," and Mr. Spafford's main task in this admirable book has been to show how, and when, an industrial disease becomes, in law, an "accident." In the first place the workman must establish that he is suffering from the specified disease, and secondly that he is incapacitated from earning. He must prove his points by producing a certificate from a certifying surgeon. When, therefore, he is in possession of the certificate, he is in a position to prove the "happening of the accident" which has resulted in his incapacity. But still, as in this hypothetical accident there was no sudden beginning but rather a gradual onset of disease, the date of the "happening of the accident" remains to be established. Mr. Spafford quotes several judgments in the Court of Appeal, and then sums up the position as follows:—

> "The most reasonable interpretation to put on the words 'the happening of the accident' and the one which does not contravene any of the judgments in the House of Lords and in the Court of Appeal, is that the accident is created or crystallised by the combination of: (*a*) The disease. (*b*) The disablement due to such disease. (*c*) The giving of the certificate of disablement or suspension. That is to say, the certificate being given the hypothetical accident comes into being for the first time, but relates back to the date of disablement as fixed by the certificate."

In all cases of industrial disease much depends upon the certificate of the certifying surgeon. It is essential that this should be made in the proper form; a whole chapter has been devoted to this certificate. An appeal lies from the finding of the certifying surgeon to a medical referee who is a legally qualified medical practitioner appointed by the Secretary of State for the purpose of the Act. The duties and powers of the medical referee are set out very clearly, and in the appendix are found the forms that should be used by him or by the certifying surgeon for all occasions. This appendix, which with the index fills very nearly half the book, also sets out at length the Workmen's Compensation Acts and extracts from the Workmen's Compensation Rules, notably those relating to certifying surgeons and medical referees. The index is complete and clear, and the book as a whole is light in weight and well printed. It should prove of the greatest assistance to those engaged in the study of the various aspects of workmen's compensation, particularly to the claims managers of insurance companies, medical referees, and certifying surgeons.

Annals of the Pickett-Thomson Research Laboratories: Influenza, Part II.

By D. THOMSON, O.B.E., M.B., Ch.B. Edin., D.P.H. Camb., and R. THOMSON, M.B., Ch.B. Edin. London: Baillière, Tindall and Cox. 1934. Pp. 916. £3 3*s*.

THIS volume completes the monograph on influenza produced by the Pickett-Thomson Laboratories. It follows the usual practice adopted in these monographs of citing all the available evidence irrespective of the value which the authors might attribute to it; anything in the nature of a critical review is confined to the summing up which is given at the end of each chapter and again in the final chapter. This is probably a wise policy, considering the difficulty of assessing the importance of recent work. The opening chapter on the complications and sequelæ of influenza occupies one-third of the book, which is not surprising considering how manifold these are. Following this are chapters on the effect of influenza on such physiological states as menstruation, pregnancy, labour, and puerperium, and on various pathological conditions, diseases of women, pulmonary tuberculosis, and other diseases. The pathology of influenza, its epidemiology, mode of transmission, vaccine and serum prophylaxis and therapy, preventive measures, and treatment form the subjects of the remaining chapters. An addendum describes work published too late to be incorporated in the appropriate chapter, and the volume ends with the authors' summary and conclusions relating to all the subjects dealt with in the whole of this monograph. Here one finds little to criticise. The conclusions drawn from the available evidence appear to be sound. The authors are firm adherents to the view that influenza is primarily a virus disease and give due recognition to the work of Smith, Andrewes, and Laidlaw. In common with most observers they recognise the importance of secondary invaders, Pfeiffer's bacillus, pneumococci, streptococci, and the like, and they stress the probability of virus and secondary invader acting together as one symbiotic agent in certain phases of influenza epidemics. In this respect they do not overlook the important researches of R. E. Shope on swine influenza. They rightly attribute prime importance to direct transfer from case to case in the mode of spread in this disease, and their conclusions as to preventive measures reflect what has been found to hold good in practice. Vaccine prophylaxis against the secondary invaders —we do not yet know what can be done in this way against the primary causal agent—is here held to be of value. This view is in keeping with that recently expressed by Dochez, but on the whole the authors' summing up of the therapeutic use of vaccines is probably tinged with undue optimism. It is interesting to note that after citing the literature on the drug treatment of influenza they conclude that the most important measures in treatment are to keep the patient warm in bed, encourage sweating, keep the bowels open, and reserve stimulants for the end of the disease and convalescence. Perhaps they are right.

Epidemic Myalgia—Bornholm Disease

By Ejnar Sylvest. With a foreword by Dr. T. Madsen. Translation from the Danish by Hans Andersen, M.D. London: Humphrey Milford, Oxford University Press. 1934. Pp. 155. 7*s.* 6*d.*

This remarkably complete monograph on epidemic myalgia is the work of a Danish general practitioner, not attached to any hospital or laboratory. In the summer of 1930, while on vacation, he observed several cases of this disease on the Danish island of Bornholm. This was the beginning of his exhaustive studies. It was on his initiative that the Danish medical authorities made epidemic myalgia notifiable in October, 1931. The fact that 10,965 cases were reported in Denmark alone between August, 1930, and April, 1934, emphasises the numerical importance of a disease which, according to Dr. Sylvest's investigations, was apparently observed in Denmark in 1897, and in Norway as long ago as 1872. The author traces its incidence in other countries such as Iceland, North America, England, New Zealand, Finland, Germany, Sweden, and Portugal. Special chapters are devoted to clinical features, epidemiology, and seasonal distribution. The hospital surgeon especially should note these details for the occasion may arise when their recollection may inhibit an impulse to verify by a laparotomy suspicions of appendicitis, perforated ulcer, or some such catastrophe to the great advantage of the patient and to his reputation.

Treatment of the Commoner Diseases met with by the General Practitioner

By L. F. Barker, M.D., Professor Emeritus of Medicine, Johns Hopkins University. Philadelphia: J. B. Lippincott. 1934. Pp. 319. 12*s.* 6*d.*

Prof. Barker's intention in this book on treatment is to give as much practical everyday help to the general practitioner as he can. He has not tried to cover the whole field of medicine, nor indeed to go deeply into any one particular branch of it, but rather to review and comment on those subjects which are of especial importance in general practice. Although mainly directed towards treatment questions of diagnosis are not ignored and many of the brief descriptions of diseases and their symptoms are very good. Prof. Barker writes in an easy style and throughout these pages there is evidence of his wide outlook on general medicine.

Few conditions met with in general practice are omitted. Most of the treatment is given in sufficiently detailed and precise terms to avoid confusion, but the large number of references will enable readers to consult original sources where desired, the full titles being given. There is indeed much in this book that should stimulate practitioners to further reading and not a little that may be new to many of them.

Gould's Pocket Pronouncing Medical Dictionary

Tenth edition. By the late George M. Gould, A.M., M.D. Revised by C. V. Brownlow. London: H. K. Lewis and Co., Ltd. 1934. 10*s.* 6*d.*

The scope of this dictionary, which is not paged, is indicated by the statement that it contains over 40,000 words. The size is only 6 × 3½ × 1 in. It thus fulfils its primary aim of a "carry-me-with-you aid." This is the sixty-eighth printing, and there are few faults to find with the proof-reading, but we must again point out that a megohm is not "one-millionth part of an ohm," and the spelling of German names —e.g., Kupffer, Aschheim—requires attention. The "dram" or "drachm" is defined simply as "a weight of sixty grains," which does not prepare the reader for the shock of finding in the table of weights and measures a dram which contains 27·34375 grains. So long as we continue to use these strange measures the lexicographer must keep us right about them. The untravelled reader will be grateful for the imitated pronunciation of many words and names; the remark that "Cruveilhier" is pronounced as "kroo-va-ya" is successful, but there is no need to pronounce "Collier" as "kol-yer." This much of criticism does not detract from the value of the dictionary as a benevolent companion who does not intend to mislead and only by misfortune does so.

Black's Medical Dictionary

Twelfth edition. By John D. Comrie, M.D., F.R.C.P. Edin. London: A. and C. Black, Ltd. 1934. Pp. 1003. 18*s.*

This dictionary is intended to assist nurses, teachers, health visitors, employers, and various boards dealing with problems affecting health and others who desire information or guidance expressed with as little technicality as possible. It was first published in 1906 and this edition completes 92,000 copies. There are 500 illustrations in the text and two full-page plates in colour. It is an interesting and useful book for the purposes stated.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 22, 1934

A CROSS-SECTION OF THE PUBLIC HEALTH

IN his annual report [1] to the Minister of Health, which appeared on Wednesday last, Sir GEORGE NEWMAN remarks that the high standard of recent years is being well maintained. Unemployment, undernourishment, and preventable malady and accident seem, he says, to be the unavoidable concomitant of current civilisation in Western Europe in the present day, and we must not assume that our continued good national health can wholly preclude the effects of such conditions falling upon certain sections of the population. Yet we are suffering less than other nations, and as a whole the health of the unemployed and their dependents "is not suffering seriously or generally." Sir GEORGE is quite definite on this point, although he sees fit to reprint a striking paragraph from his last year's survey of the physical effect of unemployment, in which he spoke of the possibility of risk of mental instability in the adult man and prolonged undernourishment of women and children. These words, he adds, seem equally true to-day and are, indeed, confirmed by the data he records. Among men in three localities—Tyneside, South Lancs, and East London—ill-health of a neurasthenic type is on the increase. The commonest ill-effect of unemployment is a slowness of recovery-reaction after illness, and in the older age-periods some general incapacity for work. Women in the North of England seem to be suffering from anæmia as the indirect result of unemployment, but in South Wales there is said to be an " almost total absence " of malnutrition. These findings are based on the personal experience of 66 regional medical officers of the Ministry, all of whom have themselves had long and varied personal experience of general practice; 25 of these officers have personally observed no ill-effects whatever from unemployment, another 25 ascribe certain minor conditions only to unemployment, no more than 16 report substantial ill-effects, and these limited to certain definite areas. But having said this, Sir GEORGE insists that it is necessary to check actual and verified data by the evidence of history. He has found since CHADWICK's classical report of 1842 ample records of the social and medical condition of the people, invaluable as a plumb-line for evaluating experience. Problems raised in the 'forties were answered by reform of local government and poor-law, and of many external conditions of living; the 1904 report on physical deterioration led to public services such as school feeding, school medical supervision, industrial welfare, care of maternity and childhood, health and unemployment insurance. This profound change has proved to be the defence of national health in the last few years of economic depression. The defence may have been imperfect but it has proved substantial.

Apart from this searching study of unemployment, Sir GEORGE reacts sharply to the reiterated assertion of physical deterioration of our race—although he admits that deaths attributed to cancer are increasing, that a large proportion of fatal illness is due to heart disease, that year by year there is a higher percentage of apparently preventable deaths from accident, that large numbers of children still enter school physically and mentally defective, that the physical condition of recruits for the army leaves much to be desired, that maternal mortality is not reduced, and that the nutrition of the people is not so good as it should be. Some of these topics are dealt with in the report, although he disclaims the possibility of a " complete periodic assize " to measure the nation's health. The greatest improvement in mortality over the past three-quarters of a century has been recorded at the ages of 1 to 5 years, and that in spite of the fact that there has been little direct intervention at this age. On the other hand, the boy and girl leaving school at 14 too often decline in physical standard during the next few years, the strain of industrial life coming, it may be, too early upon them. To meet this, Sir GEORGE remarks, the time may have come for some subsidising or constructive action by the State itself. The general nutrition of the people he finds better to-day than at any past period. Happily they are learning to like the " protective foods " such as milk, eggs, fish, fruit, and fresh vegetables of which there has been an enormously increased consumption. The situation, he remarks, does not call for the imposition of a standard dietary. Tuberculosis remains an anxious problem in its effect on women between 15 and 25 years of age, who do not share in the general decline of disease. In a final paragraph Sir GEORGE NEWMAN deals frankly with the arrest of maternal mortality at or about 4 deaths per 1000 births during the last twenty years. Clearly, he says, we must await the slow but sure reaction of the effect of education on each of the five groups—school girls, potential mothers, prospective husbands, midwives, and medical practitioners; but he again draws public attention (on p. 262 of the report) to the counties and towns which are chiefly responsible for the continuance of an exceptionally high maternal mortality, and on the following page he sets out for comparison the ten-year averages of the Queen's Institute and some of the lying-in hospitals and institutions whose death-rate is only a quarter of the general experience. Control of detail, he remarks, is the master-key to the whole problem.

These are but a sample of subjects dealt with in a survey which every thoughtful citizen should read for himself—in spite of the 264 closely written pages, not including the 30 pages of appendices. It is unfortunate that the price of the review should be treble what it was in 1920 and still rising.

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[1] On the State of the Public Health. Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1933. H.M. Stationery Office. Pp. 295. 4s. 6d.

ERYTHEMA NODOSUM AND TUBERCULOSIS

Anyone who studies what is written about erythema nodosum will get the impression not only that it is much commoner in some countries than in others but also that its cause or causes differ from place to place. It seems probable, however, that these differences are more often in the eye of the beholder than in the condition itself. As Dr. Gerald Slot pointed out in our last issue there are now four main theories of its causation. Some hold it to be an infectious disease on its own account ("nodal fever"); some regard it as a manifestation of acute or subacute rheumatism; some consider it a symptom of tuberculosis; and some again argue with W. R. F. Collis[1] that it may be produced by various different toxins, being attributable to tuberculosis in one case and to streptococcal infection in another. Dr. Slot, having had good results from anti-scarlatinal serum, thinks it likely that in London at any rate the majority of cases are due to a streptococcus and not to the tubercle bacillus. This opinion will find many supporters, but is offset by the results recorded in another paper which has lately appeared[2] by Dr. L. Forman and Dr. G. P. B. Whitwell of the skin department at Guy's Hospital.

To test the various theories of ætiology Forman and Whitwell have studied 50 cases seen in the department, and have followed up 31 of them. From these "preliminary observations" they deduce that the rheumatic theory, though still prevalent, especially in England, "is undoubtedly a menace to the proper treatment of erythema nodosum." True, a sore-throat sometimes precedes the appearance of the nodes, and this brings the illness into correspondence with rheumatism and streptococcal infection; but they believe it to be merely an activator of tuberculous foci. "Were a streptococcus precipitated into the blood by these sore throats in erythema nodosum one would expect an occasional streptococcal septicæmia to follow, whereas if any grave disease follows the nodes that disease is tuberculosis." Indeed, examination of their cases persuades them to accept Ranke's view that erythema nodosum should definitely be considered a secondary manifestation of tuberculosis. The probable course of events, they say, is as follows:—

> "A primary inoculation of tubercle bacilli occurs, usually in the respiratory tract, but occasionally in the skin or elsewhere. After some weeks the body becomes highly allergic to tuberculin, and should by some chance small numbers of tubercle bacilli enter the blood stream and lodge in the tissues they will by their presence set up an acute reaction in which they are destroyed. If the numbers of bacilli in the blood are numerous, although erythema nodosum may occur early on, the final result is likely to be a miliary tuberculosis and a depressed sensitivity to tuberculin. We suspect that the same depression may subsequently occur in those cases of erythema nodosum, in which there are severe constitutional symptoms or an unusually large number of nodes or a few very intensely inflamed nodes or a severe sore throat."

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ERYTHEMA NODOSUM AND TUBERCULOSIS

Anyone who studies what is written about erythema nodosum will get the impression not only that it is much commoner in some countries than in others but also that its cause or causes differ from place to place. It seems probable, however, that these differences are more often in the eye of the beholder than in the condition itself. As Dr. Gerald Slot pointed out in our last issue there are now four main theories of its causation. Some hold it to be an infectious disease on its own account ("nodal fever"); some regard it as a manifestation of acute or subacute rheumatism; some consider it a symptom of tuberculosis; and some again argue with W. R. F. Collis[1] that it may be produced by various different toxins, being attributable to tuberculosis in one case and to streptococcal infection in another. Dr. Slot, having had good results from anti-scarlatinal serum, thinks it likely that in London at any rate the majority of cases are due to a streptococcus and not to the tubercle bacillus. This opinion will find many supporters, but is offset by the results recorded in another paper which has lately appeared[2] by Dr. L. Forman and Dr. G. P. B. Whitwell of the skin department at Guy's Hospital.

To test the various theories of ætiology Forman and Whitwell have studied 50 cases seen in the department, and have followed up 31 of them. From these "preliminary observations" they deduce that the rheumatic theory, though still prevalent, especially in England, "is undoubtedly a menace to the proper treatment of erythema nodosum." True, a sore-throat sometimes precedes the appearance of the nodes, and this brings the illness into correspondence with rheumatism and streptococcal infection; but they believe it to be merely an activator of tuberculous foci. "Were a streptococcus precipitated into the blood by these sore throats in erythema nodosum one would expect an occasional streptococcal septicæmia to follow, whereas if any grave disease follows the nodes that disease is tuberculosis." Indeed, examination of their cases persuades them to accept Ranke's view that erythema nodosum should definitely be considered a secondary manifestation of tuberculosis. The probable course of events, they say, is as follows:—

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ANNOTATIONS

SEX FACTORS IN INTELLIGENCE

It is a well-attested fact that mental defect occurs more frequently in the male than in the female sex, and an investigation has been made in and around Los Angeles by Dr. A. J. Rosanoff and others[1] with a view to determining whether throughout the whole range of intelligence the superiority of the female is as noticeable as at the lower level. The material examined was 233 pairs of opposite-sex twins who are described as of normal or superior intelligence, the criterion being an I.Q. above 75; a relative excess of cases of higher intelligence among girls was discovered amounting to 22·5 per cent. The method of stating the results, however, is open to criticism, for it masks an important fact brought out in a recent inquiry by Dr. T. A. Danby reported in *Mental Welfare* a few months ago. Dr. Danby found a distinct preponderance of mentally defective boys over mentally defective girls, but no significant difference among the average school population, while among children with an I.Q. of 130 and upwards boys exceeded girls in number to the extent of 22 per cent. Among boys there are, as he said, "more geniuses and more imbeciles." When one looks into the detailed figures of the American inquiry one finds that although I.Q.'s above 130 were relatively rare among the twins, the number of boys at that level of mentality exceeded the girls by 21 per cent. This point seems to have escaped the Los Angeles investigators. They have, however, developed a further line of argument of considerable significance. Having satisfied themselves that sex-linked genetic factors enter into the causation of mental defect, they proceeded with an attempt to discover what other factors are involved. For this purpose a comparison was made between monozygotic and dizygotic twins. In 15 out of 34 cases of monozygotic twins, the I.Q.'s of the two twins differed by not more than five points, indicating, therefore, considerable similarity in hereditary endowment, but in 4 cases there was so great a discrepancy as to make it necessary to suppose that prenatal and intranatal factors were at work. Such factors operate more prejudicially on the male than on the female infant as is shown by the greater mortality in fœtal and early infant life among males. Male life is evidently more vulnerable and the authors conclude that the cerebrum shares that vulnerability; it is thus that they account for the higher incidence of mental defect in males. As further evidence for their suggestion figures are quoted showing that the average I.Q. of 424 first-born boys was 103·7 and that of 448 first-born girls was 107·6. The investigation will stimulate the increasing interest which is being taken in the effect of environmental factors on the production of mental defect. While in the majority of cases there is admittedly a hereditary basis, the possibility should not be overlooked of environmental factors in borderline cases tipping the scale to one side or the other. If the Los Angeles view is confirmed it will serve as a useful reminder that eugenics may be applied to the environment as well as to the stock.

MORPHINE FROM POPPY STRAW

The Advisory Committee of the League of Nations recently became aware[2] of a new process for extracting morphine and other alkaloids from poppy straw and poppy chaff remaining after the ripe capsules have been thrashed to separate the seeds. These parts of the plants have hitherto been regarded as useless and destroyed, or utilised as a poor quality of manure. The discoverer of the new "dry process" is Mr. de Kabay of Hungary, and it has been exploited by the Alkaloida Co., Ltd., in which the principal shareholders are the Royal Hungarian Ministry of Agriculture and the de Kabay family. The process is regarded as a new source of income for agriculture and, owing to the ease with which stocks of the raw material can be accumulated, transported, and stored, the manufacture can be uninterruptedly carried on throughout the year. There are, at the present time, some 8000 hectares of land in Hungary under poppy cultivation, yielding some 13,000 tons of poppy straw annually. One ton of poppy straw can be made to yield 800 grammes of morphine base and 80 grammes of codeine base; thus some 10,000 kilos of morphine and 1000 kilos of codeine could be annually produced. The quality of the alkaloids is pronounced to be the same as that obtained from raw opium and to meet all pharmacopœial requirements. The effect of this new discovery on the supply of morphine for licit, and also illicit, purposes is likely to complicate still further the international control of drugs of addiction. It is reported that in the first three months of this year 40 kilos of morphine, thus made, have been exported from Hungary, and negotiations are in progress for increasing the export trade when the extension of the factories now under construction shall have been completed. The Hungarian Government and the inventor of the process are prepared to enter into arrangements both with private undertakings and Governments for the sale of the secret of the new process to foreign producers under certain conditions. All this makes it important to expedite the summoning by the League of Nations of the projected conference on the production of the raw materials of dangerous drugs.

RADIOGRAPHIC DETECTION OF TUBERCULOUS RECRUITS

The recent progress made by radioscopy in the diagnosis of intrathoracic tuberculosis is given prominence in a report made to the French Academy of Medicine on July 17th by Dr. H. Rouvillois.[1] It may be recalled in passing that as long ago as 1923 Colonel Hauser introduced the systematic radiological examination of recruits in the Swiss army. Elsewhere, isolated industrial, commercial, and university centres, such as that of Munich, have adopted the same principle with impressive results; and some radiological enthusiasts have even been tempted to point the finger of scorn at the older methods of auscultation and percussion. In France, birthplace of Laennec, this mistake has not been made, and in the army at least the radiologist and the clinician work hand-in-hand. The first systematic radiological examinations of French soldiers were undertaken in 1928. From 1932 onwards this system has made rapid progress and in November, 1933, more than 80,000 recruits were examined by a mobile radiological team equipped and organised so as to comb out tuberculous suspects in one barracks after another with a minimum of friction and a maximum of speed and efficiency. This team classifies its material on a broad basis as radiologically healthy, diseased, or suspect; the mobile radiological unit being a large-toothed comb, not designed for hair-splitting, every doubtful case is referred for a later examination at which time and equipment allow of greater finesse. When the findings of the mobile unit are unequivocal, gross lesions being demonstrated, the patient is referred for clinical, bacteriological, and radiographic examination to a special hospital staffed by experts. Hitherto, out of a total of 115,150 recruits examined in the course of the past two years, 1093, or 0·94 per cent., have been combed out, 143 have been found to be suffering from open tuberculosis with tubercle bacilli in the sputum. This is of interest since all the recruits have previously been subjected to clinical examination. The figures indicate that only two-thirds of the tuberculous cases had been discovered in this way, the remaining third being missed until the radiological investigation.

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[1] Jour. Nerv. and Ment. Dis., August, 1934, p. 125.

[2] See THE LANCET, August 18th, p. 368.

[1] Bulletin de l'Académie de Médecine, 1934, cxii., 115.

WATER SOFTENING AND HEALTH

CHALK is the subsoil over a large area of south-eastern England and the water which it contains in abundance, although pleasant to the taste and excellent for making tea, is too hard to be convenient for some other domestic purposes. There is consequently an increasing tendency among householders in the home counties to soften the water supplied to them, and a correspondent has asked for guidance as to whether this has any drawback to health. So far as water is used for washing either the person, household utensils, or fabrics, it is undoubtedly advantageous that it should contain little calcium or magnesium salts, since these form insoluble soaps which adhere to the thing washed, carrying with them some of the dirt which should be removed. The classical softening process of Clark in which milk of lime is made to react with the bicarbonates of calcium and magnesium, removing them almost entirely as normal carbonates which are only soluble to the extent of a few parts in 100,000 of water, introduces nothing in place of the alkaline earths it removes. The process requires a fairly precise knowledge of the mineral content of the water to be softened and the reaction is slow, especially if the temperature is low. If the hardness of the water is not due to carbonates but to sulphates or other salts, sodium carbonate must be used as well as lime. The process could be worked in a private house, especially if two cisterns were used alternately, but the average householder would find it rather inconvenient. The growing use of base exchange materials for water softening for industrial purposes has led to their application to domestic supplies, and small appliances in which the water from a tap flows through a layer of one or other of the natural or artificial silicates which readily take up calcium or magnesium from solution in the water, and in exchange part with sodium, are offered for sale—at rather high prices. These materials are rapid in action and efficient as softening agents. The speed of reaction slows down as the exchange approaches completion, and it is necessary, from time to time, to reverse the reaction by passing a strong solution of common salt through the layer of base exchange material, thereby reconverting the calcium or magnesium double silicate into a sodium one. After many cycles of these changes the material needs renewing. The softened water contains sodium salts in amount equivalent to the earth bases removed. Bricks of sodium phosphate, or mixtures of this salt and sodium carbonate, are also used to precipitate insoluble calcium or magnesium phosphate and carbonate. They are effective so long as they last, but in the earlier stages some excess of sodium salts will be present in the softened water and in the later stages the softening is likely to be incomplete. The base exchange method is the only one which can safely be left to itself. Few people are under any compulsion to drink artificially softened water, for there are not many suppliers, whether municipal or private, who soften the water they supply. If they do it seems unlikely that they will come to any harm, for the mere substitution of sodium for calcium and magnesium ions can hardly have any appreciable effect on health, either for good or ill.

MENINGOCOCCAL CARRIERS

SINCE the demonstration in 1901 by Albrecht and Ghon that carriers of the meningococcus occurred this question has received much attention. Thanks very largely to the war time researches of English workers—notably W. M. Scott, J. A. Glover, and M. H. Gordon—precision was given to our knowledge of the meningococcal carriers, and the overwhelming importance of the carrier in the spread of cerebro-spinal fever was firmly established. Recent investigations by Dr. Geoffrey Rake[1] at the Rockefeller Institute bring additional information. The object of his research was to find out the duration of the carrier state, whether remissions of the state occur, and if so whether remissions are associated with any change in type of meningococcus carried, the distribution of types among carriers in a non-epidemic period, and finally the effect of disease of the upper respiratory tract on the carrier state. Observations were made on three groups of persons: a group of 24 adults working on one floor of the Rockefeller Institute, a second group comprising 25 girls aged from 6 months to 14 years who were inmates of a foundling home, and a third group composed of 569 young men in a concentration camp. The findings in the first group are the most important, for they represent the result of weekly swabbings made over a much longer period than has been usual in this type of investigation. Of the 24 persons composing this group—secretaries, technicians, and research workers—13 were examined weekly for twenty months, 2 for fifteen months, 8 for four months, and 1 for seven months. 10 carriers were found in this group, 5 being chronic carriers. 4 of these continued to harbour the meningococcus in the nasopharynx throughout the period of observation and showed no signs of undergoing spontaneous relief when the inquiry was discontinued; the fifth, after carrying the meningococcus for five months without remission, developed a cold with the appearance of a type XIII pneumococcus in the throat in large numbers. This coincided with the disappearance of the meningococcus from the throat, and although unfortunately this person was only under observation for six weeks subsequent to this, he continued free during this period. 3 out of the 4 chronic carriers gave negative swabs from time to time, in one case over a period of four and a half months, but the meningococci always reappeared again in the nasopharynx and, what is particularly interesting, the type of meningococcus carried always remained the same. This observation, as Dr. Rake points out, makes three negative swabs at weekly intervals of little use as the criterion of cure of meningococcal carriers. Of the remaining 5 carriers in the Rockefeller group, 2 were intermittent and the strains carried were not the same, whilst the remaining 3 were transient carriers in whose throats the meningococcus only appeared on one occasion. The carrier-rate in the remaining two groups was 8·0 and 2·1 per cent. respectively, but the difficulty of obtaining satisfactory swabs from children and the fact that none of the persons in the third group was under observation for more than three weeks might readily account for the divergence between those figures and the 41·6 per cent. found in the Rockefeller group.

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[1] Studies from the Rockefeller Institute for Medical Research, New York, 1934, lxxxix., 69.

AN OLD PROBLEM SOLVED

FIVE years ago Dr. Franz Nagelschmidt of Berlin sought to move the hearts of the Tuberculosis Association meeting in Cambridge[1] in favour of Friedmann's turtle-vaccine therapy, his most telling argument being the recital of an experiment conducted by Dr. Eugen Szalai in Pesterzsebet, a small industrial suburb of Budapest. Dr. Szalai claimed that an extraordinary decline in the death-rate from tuberculosis occurred in this area after widespread vaccination with the turtle tubercle bacillus; of 4812 cases of pulmonary tuberculosis treated in the years 1925–27 by this method 12 died, 9 became worse, and the remainder were cured. There was a feeling in this country and on the continent that these results were difficult to reconcile with the results obtained by other workers—that they were in fact too good to be true. A year after the publication of Szalai's paper,[2] Dr. J. Parassin pointed out in the same journal[3] that, Pesterzsebet possessing no hospital of its own, all grave cases of tuberculosis were sent to the hospitals at Pest, thus greatly improving the statistics of the former at the expense of the latter. A complete elucidation of the problem is now to be found in a book by Dr. Friedrich Wolter, director of the Hamburg Epidemiological Research Institute, entitled "Das Tuberkulose-Rätsel von Pesterzsebet und seine Lösung vom epidemiologischen Standpunkt" (Leipzig: Georg Thieme). Wolter points out, first, that the problem can only be solved by statistical methods, and that in the absence of figures for morbidity any mortality-rates lose much of their value—this being especially the case with a chronic disease like tuberculosis, which may last 20 years. Dr. Wolter then shows rather unkindly that the fall in the tuberculosis death-rate in Pesterzsebet was greater in the years 1920–24 when the Friedmann vaccine was not used than in the years 1925–32 when it was. He justifies Parassin's criticism in a table showing that if the number of deaths be calculated with regard to the place in which the patient lived, instead of where he died, the reduction is nothing like so marked. He gives another table comparing the reduction in the mortality-rate in Pesterzsebet with that in five other industrial towns of similar size in Hungary between the years 1920 and 1932. The percentage reduction in 1932 compared with that of 1920 ranged between 72·3 in Czepel (which had no Friedmann vaccination) and 56·7 in Kleinpest, Pesterzsebet coming between with 68·9. In these ways Wolter rules out the suggestion that turtle-vaccine had anything to do with the improvement in the tuberculosis mortality in Pesterzsebet. The reduction he believes to be due to the earlier recognition, earlier treatment, and more adequate after-care of the patients, but most of all to the vastly improved measures of practical hygiene undertaken in the town. Wholesale draining operations, cleansing and clearing the ground, better sanitation, the provision of a safer water-supply, and the planning of healthy homes on the lines of a small garden city—these are the chief factors which have resulted in the improvement. His scholarly work will set at rest the minds of many who could not put aside some striking evidence just because it was a priori improbable. It is also testimony to the fact that the chief factors in the diminution of tuberculosis are the same in Hungary as elsewhere.

PATHOGENESIS OF ANGINA PECTORIS

WITH few exceptions, angina is associated with gross lesions of the coronary arteries, most commonly atheroma in the course of the vessels, much less often with a syphilitic process at their mouths; and it is generally believed that these processes, by limiting the coronary blood-flow to a volume insufficient for the needs of the myocardium, are the root causes of the pain. Whether or not spasm of the diseased vessels or their subdivisions occurs and plays a part in reducing blood-flow is not at all certain, though there is no doubt that the calibre of the vessels is under nervous control. Under physiological conditions the coronary blood-flow stands in a fixed relation to the heart's work, and the experiments of Anrep and Segall showed that when this increases, dilatation of the coronaries occurs as a result of diminished vagal activity. Anoxæmia of the muscle is an obvious consequence of an inadequate coronary flow, and it has been thought by many that this was the cause of angina. This question is discussed by S. Dietrich and H. Schwiegk,[1] and they quote animal experiments in which electrocardiographic changes similar to those occurring in angina pectoris and coronary occlusion result from oxygen deficiency in the inspired air. Again T-wave changes could be brought about in healthy men by artificial anoxæmia, while in anginal subjects there was in addition onset of typical pain. This last was not relieved by vasodilators, though when these were taken as a prophylactic the onset was delayed. On the other hand, pain was quickly relieved by oxygen or ordinary air. These experiments are held to rule out coronary spasm as a factor in pain production. The effect of generalised anoxæmia on the electrocardiogram of normal subjects is also reported on by L. N. Katz, W. W. Hamburger, and W. J. Schutz (Amer. Heart Jour., August, 1934, p. 771), who found depression or inversion of the T wave, and deviation of the ST segment, as has been observed in spontaneous angina. None of these normal subjects, however, experienced any pain. Applying the same method to anginal patients similar changes occurred in the tracings, but in only two of six cases was pain produced. It is to be noted that considerable tachycardia occurs during the experiment, in itself a possible cause of pain. The procedure appears to be risky, and the authors condemn it as a diagnostic test for angina. They conclude that some other factor than anoxæmia is concerned in angina, since it failed to occur in any of their normal subjects and in the majority of their patients. To this may be added the fairly recent knowledge that coronary thrombosis may be accompanied by a variety of symptoms other than pain. Dietrich and Schwiegk reject coronary spasm as a factor in the cardiac pain of effort, yet they appear to countenance deficient dilatation of these vessels (attributed to a failure of vagus inhibition) as a cause of angina resulting from emotion. They also speak of reflex constriction of the vessels resulting from distension of some portions of the gastro-intestinal tract. However, under both these conditions the cardiac load is increased, and, in the presence of some arterial lesion preventing a corresponding increase in blood-flow, there would appear to be adequate cause for cardiac pain, and no necessity to invoke another factor. The fact that changes in the electrocardiogram similar to those occurring in spontaneous angina are produced in normal men when they suffer from oxygen shortage suggests that there is a functional disturbance of the muscle in both cases; yet we do not know the relation between this defect and the sensation of pain, and cannot be surprised that it is not experienced in the normal subject. At the present time the conception of angina as being in some way dependent on a relative ischæmia of the heart muscle rather than purely on an anoxæmia appears more acceptable.

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[1] THE LANCET, 1929, ii., 36.
[2] Münch. med. Woch., 1929, lxxvi., 2097.
[3] Ibid., 1930, lxxvii., 268

[1] Deutsche med. Woch., June 29th, 1934, p. 967.

A DIRECTORY OF SOCIAL HYGIENE

THE term social hygiene is sometimes used in a restricted sense to denote the efforts made to eliminate the venereal diseases, sometimes in the wider sense of the application of biology, psychology, and sociology to the promotion of health and racial well-being. It is in the broader sense that the British Social Hygiene Council has construed the term since the change in its official title nine years ago, and evidence of this wider scope is seen in the appearance of a Year-book [1] which is the first comprehensive survey to be made of social hygiene. The book, which is compiled from material made available to the Council by the various Government departments concerned, contains recent information of the incidence of venereal disease, of the means taken to prevent it, and of the channels for its treatment in towns and counties at home and throughout the Empire. This much would already be of much value, but the net is spread to include the wider agencies for the promotion of right thinking and action. Instructive notes on the development of biological education in the colonies are based on replies to a questionnaire recently issued by an advisory committee of the Colonial Office. It is the plan of the Year-book to take one dominion or group of colonies for the subject of a special survey, and Canada, the senior dominion, appears as the first study in this number. The volume also contains some general articles, including one on the methods of propaganda and their results by Mrs. S. Neville-Rolfe and another by Colonel L. W. Harrison on the administration of venereal disease in Great Britain, what has been done and what might be done in the future. Appendices contain a list of voluntary associations, British and international, and a few hints on what to choose for further study, whether in biology, physiology, or the social applications of hygiene.

MONGOLISM AND MATERNAL AGE

MANY years ago it was observed that mongolian imbeciles are often the last children to be born in a long family, a fact which has suggested that the condition may be a product of the exhaustion of the maternal reproductive powers. Evidence since then has accumulated to show that though affected children are not necessarily born at the end of the family, their birth rank is certainly, on the average, significantly later than that of normal children. At the same time it has been clearly shown that though some of these imbeciles have young mothers, the great majority of them are born after the mother has reached the age of 35 years. This is the experience of a recent survey[2] by Dr. K. Rupilius at the University children's clinic at Graz. Which of these two correlated factors, birth order and maternal age, is the more important in the ætiology of the affection has not been determined. Indeed, with a limited amount of material available it is no easy task to disentangle one from the other. To this problem Dr. L. S. Penrose has recently addressed himself.[3] Working in the research department of the Royal Eastern Counties' Institution he has secured the maternal age at birth and the birth order for all offspring in 217 sibships each containing one or more mongolian imbeciles—1031 persons in all, of which 224 were affected. Upon these data he brings a mathematical statistical battery to bear, and his two different methods of approach agree in denying any ætiological importance to order of birth. In fact they show that the numbers of imbeciles in each birth rank are very close to those which would be expected on the assumption that the incidence depends upon maternal age. Another factor which some writers have believed to be of importance is the interval between the birth of a mongolian imbecile and the birth of the child immediately preceding it, an interval which has been found to be on the average unduly long in comparison with that between normal births. According to the careful analysis of this study it is not possible to assign any direct causal significance to this factor either. The underlying influence is again, probably, maternal age, an increase in which tends slightly to lengthen intervals between births.

SCHOOL PHYSIQUE IN AUSTRALIA AND IN ENGLAND

Dr. Jane S. Greig, who is chief medical inspector to the education department of the State of Victoria, has recently paid a visit to this country and compared the conditions [4] she has found among the school-children here and those with which she is familiar. Crippling conditions are less prevalent in Australia; the figures she gives to illustrate this are: congenital hip deformities, 1 in 2000; congenital talipes, 1 in 1000; tuberculosis of bones and joints, 1 in 2000; deformities after infantile paralysis, 1 in 500. The percentage of children in Australia with defective vision is much the same as what it is in England or Scotland, but "in the Old World," Dr. Greig says, "cases of defective vision have to be taken very seriously as the large proportion are due to myopia. This defect . . . is so serious . . . that the children have to be provided with special forms of education. In Australia, on the other hand . . . a country of sunshine, open-air life, and good food . . . progressive myopia is . . . a rarity." While malnutrition has been a problem in the State, "on the whole," Dr. Greig says, "the children have survived wonderfully the ordeal of the period of depression and the consequent unemployment of many fathers of families. Their weight has been maintained to a surprising degree, but I fear that later we will have evidence to show that a large number of children of the unemployed have suffered in stature and are below the average height for their age. This is probably due both to lack of suitable food such as milk and vegetables, and to overcrowding, which is very marked in the more densely populated inner suburbs." It surprises many to know, Dr. Greig goes on, that visible malnutrition is not the first or most noticeable evidence of poverty. "In our experience it is dirt and neglect. Flea-bites, which had become almost a rarity, are becoming prevalent again, for soap and hot water is considered an unnecessary expense when money is scarce." That heights and weights in future will be lower is against general experience. Dr. Greig compares her own figures (for 1922) with those of Bournville, one of England's best, when Australia comes out well. Both sets of findings are, however, below those of Heston (Middlesex), which have been accurately estimated by Dr. Victor Freeman [5] for 1933.

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[1] Empire Social Hygiene Year-book 1934. London: George Allen and Unwin. Pp. 509. 15s.

[2] Wien. klin. Woch., p. 1060.

[3] Proc. Roy. Soc., Series B, cxv., p. 431.

[4] Health Bulletin, Victoria, Jan.–June, 1934.

—		Bournville, 1922.	Victoria, 1922.	Heston, 1933.
Boys of 8 years	Ht. (ins.) ..	48·3	48·3	49·5
	Wt. (lbs.) ..	52·9	53·4	57·1
Girls of 8 years	Ht. (ins.) ..	48·6	47·8	48·9
	Wt. (lbs.) ..	50·3	52·0	54·4
Boys of 12 years	Ht. (ins.) ..	54·8	54·5	56·5
	Wt. (lbs.) ..	71·8	74·9	78·5

Dr. Freeman has calculated nutrition quotients on Quetelet's formula. He finds that in general the cases deemed on clinical observation to be of subnormal nutrition fell mainly in the group with low nutrition quotients, except with the 12-year-old boys; a discrepancy, he thinks, largely accounted for by the fact that this is a rapidly growing period of life for many boys. The paucity of several types of defect in the Victorian children going hand in hand with good physique is in accordance with a general rule brought out statistically by Dr. Freeman that many important clinical defects diminish in frequency as the nutrition quotient rises. The relationships established appear to justify his claim that weights, heights, and nutritional quotients, when classified in relation to physical defects, may give as reliable a picture of the well-being, or otherwise, of the community as can at present be obtained.

IMPAIRMENT OF ANTITYPHOID VACCINES BY PHENOL

EVIDENCE accumulated from many sources indicates that, among the many antigenic components contained in the typhoid bacillus, the complex polysaccharide that is present at the surface of the bacillary bodies in their normal smooth form plays a predominant rôle in the reactions that establish an active immunity. There have certainly been hints that this is not the whole story; in July last [6] we published a paper by Felix and Pitt, in which they showed that some antigenic component other than the smooth somatic polysaccharide—the O antigen—is concerned in effective immunisation against virulent strains of the typhoid bacillus. But the exact relationship of this new component to the O antigen has not yet been established, and its detection, as Felix himself insists, in no way conflicts with the accepted view that the O antigen itself is an important factor in immunisation.

Another controversy, of interest from the practical point of view, has centred round the antigenic efficiency of the O component as it exists in an ordinary typhoid vaccine. It has been stated by some that while an attack of typhoid fever leads to an abundant production of both O (somatic) and H (flagellar) antibodies, antityphoid vaccination fails to induce the former response and is followed only by the production of flagellar agglutinins, which by general agreement are immunologically ineffective. Other workers have, however, failed to confirm these statements in their categorical form, and it is probably a fair summary of current views to say that antityphoid vaccination is followed by the production of both O and H agglutinins, but that the useful O agglutinins are produced to relatively low titre, and persist in the circulating blood for only a short time, while the useless H agglutinins are produced to high titre and persist for months or years. In our current issue Drs. Stuart and Krikorian record a series of observations from which they conclude that the failure to induce a more satisfactory O response has been due, in part at least, to an inactivation of the O antigen by the phenol added to the bacillary suspension. Employing three vaccines, all killed by heating at 60° C., but differing in that the first received an addition of 1 per cent. phenol, the second 0·5 per cent., while the third was left unphenolised, they inoculated a series of rabbits and men and determined the resulting titre of O and H agglutinins at varying intervals thereafter. Each vaccine induced an abundant production of H agglutinins, nor did the titre differ significantly in the three groups. Each vaccine also induced the formation of O agglutinins; but while the response to the vaccine containing 1 per cent. phenol was relatively poor—titres of 1 : 200 to 1 : 2000 in rabbits and 1 : 100 to 1 : 200 in men—the response to the non-phenolised vaccine was far more satisfactory—titres of 1 : 2000 to 1 : 10,000 in rabbits and 1 : 200 to 1 : 2000 in men. Moreover, tests at later intervals showed that O agglutinins were still present to relatively high titre three months after the inoculation of the non-phenolised vaccine, while these antibodies had disappeared, or sunk to a very low titre, in the rabbits or men injected with the vaccine containing 1 per cent. phenol. The vaccine containing 0·5 per cent. phenol, which was tested only in rabbits, gave intermediate results.

The importance of retaining the antigenic activity of particular bacterial components in any preparation used for active immunisation is receiving added emphasis with each increase in our knowledge; and the demonstration that phenol, so commonly used as an antiseptic addition to immunological reagents, may seriously impair the activity of some of them should be carefully noted, and its possible implications further explored.

PROF. F. A. E. CREW, director of the Institute of Animal Genetics at Edinburgh, will deliver the Lloyd Roberts lecture at the Royal Infirmary, Manchester, on Tuesday, Nov. 6th, at 4.15 P.M.

THE hundredth anniversary of the foundation of the University of Durham College of Medicine at Newcastle-upon-Tyne will be celebrated at Newcastle on Oct. 4th and 5th. A convocation will be held in the chapter house of Durham Cathedral at which the honorary degree of doctor of civil law will be conferred on Sir Hilton Young (Minister of Health) and Sir Holburt Waring, P.R.C.S.; of doctor of hygiene on Sir Francis Dyke Acland (chairman of the Dental Board) and Dame Janet Campbell, M.D.; of doctor of surgery on Major General J. A. Hartigan (director-general, A.M.S.), Mr. J. W. Leech, M.S., M.P., and Mr. William Robinson, M.S.; and of master of arts on Dr. W. D. Arnison.

NATIONAL SMOKE ABATEMENT SOCIETY.—The sixth annual congress of this society will be held in Glasgow under the presidency of Dr. H. A. Des Voeux from Sept. 27th to 29th. Among those who will read papers is Dr. J. Johnstone Jervis, medical officer of health for Leeds, who has chosen as his subject slum clearance and smoke prevention. The address of the society is 36, King-street, Manchester 2.

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[5] Medical Officer, August 18th and 25th.
[6] THE LANCET, July 28th, p. 186.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XIX.—PROGNOSIS OF PARALYSES IN CHILDREN

(EXCLUDING POLIOMYELITIS)

THE paralyses met with in childhood form so miscellaneous a group that much subdivision and classification are necessary before prognosis can be adequately considered. Moreover, it is particularly in cases of this kind that the prognosis as regards life and as regards the course of the disease show so little correspondence. In many of them, although the outlook is often dismissed—in a sense accurately—as "hopeless," in that the disorder is not amenable to treatment, yet its course is so benign that questions as to the child's present and future régime need consideration, and indeed are of great importance. From the viewpoint of prognosis the paralyses of childhood may be divided into two groups, according to whether the lesion on which they depend is *progressive* or is *residual*. It is important to remember that the lesion and not the clinical condition is referred to; paralyses, even though occasioned by a purely residual lesion, may deteriorate under unfavourable conditions, and give the impression that the disease is progressive. This is exemplified by a diplegic whose mental condition does not permit of suitable treatment, and it has led to an erroneous idea that spastic palsies in general are progressive.

Progressive Paralyses

The progressive paralyses which most frequently raise practical questions of prognosis are the myopathies and the abiotrophies. There are also certain toxic and degenerative conditions in which extrapyramidal syndromes predominate, and a group of fatal degenerations of infancy and early childhood. Progressive paralyses in children nearly always result from familial diseases.

Myopathies.—The commonest type is the one in which the prognosis is most unfavourable—i.e., pseudo-hypertrophic muscular atrophy. The patient —almost always a boy—shows evidence of the affection about the age of five; it may not be until a year or two later that the diagnosis can be made with certainty. Once this has been done the prognosis leaves little room for doubt. The muscular weakness, aggravated by lordosis, scoliosis, and other postural defects which it is impossible to combat, will increase steadily and somewhat rapidly, so that in the course of three or four years the child will become crippled or bedridden. This state of affairs is usually not of long duration; these children lack resistance to disease and seldom live beyond childhood or early adolescence. The outlook is so bad that no useful purpose is served by making preparations for the future or pressing education. Much sacrifice and disappointment will be saved if this fact is stated candidly at the outset.

In other forms of myopathy the prognosis is different, and cannot be stated so confidently. In the *facio-scapulo-humeral* type the onset is in early childhood, but it runs no constant course, and in some cases it seems to become more or less stationary in later years. In the rare *juvenile* (*Erb*) type the outlook is better still, owing to the later age of onset. Neither of these types have any great tendency to shorten life, so that education and vocation must be considered. Each case must be judged individually, but it should be borne in mind that such atrophy as has taken place will be permanent, and that at any rate *some* deterioration of function in the affected part is to be expected.

Cases of myopathy are seen which represent a mixture of these types, and in them the prognosis may be difficult. In general, the more pseudo-hypertrophy is present the worse is the outlook.

Abiotrophies.—These are represented most typically by Friedreich's disease, in which there are hypotonus and ataxia without muscular atrophy, and by neural muscular atrophy (Charcot-Marie-Tooth), in which muscular wasting is the salient feature.

It is always a difficult matter to convey to parents an idea of what may be expected for a child affected by *Friedreich's disease.* In the first place, the expectation of life is extremely uncertain. These children resist infections badly, and probably about half those seen in hospital practice fail to reach adult life. On the other hand, if care and home conditions are good the probability is that they will do so, and they have a good chance of surviving three or four decades. Once the years of puberty are passed the disease seems to progress much more slowly, or even to become stabilised. These children's future is greatly complicated by the mental factor. Though not actually defective, they are nearly always below the average in mental powers, particularly in concentration and initiative. It is therefore unwise to suggest that they shall compensate for their physical limitations by engaging in intellectual occupations. A considerable number of them, however, do earn their livings in the less skilled forms of employment.

In the *Charcot-Marie-Tooth* type of atrophy the prognosis is decidedly better than in Friedreich's disease, although the wasted appearance of the legs suggests a more severe disablement. Individual cases vary considerably, and it is well to warn parents that there is some danger of the child becoming seriously crippled, as well as of the mischief spreading to the hands. But mostly the disease runs a very benign course; the patients survive adolescence and succeed in earning their livings under the limitations imposed by their disability. Their mental powers are in no way below the normal. On re-examining one of them after an interval of a year it is often impossible to detect any extension of the disease. Hence the orthopædic surgeon is justified in undertaking more radical measures for prevention or correction of deformities, and the prognosis is improved thereby. In the majority the power of walking will be preserved, although it may be somewhat of a labour, particularly in going up stairs and inclines.

In the group of progressive degenerations in which extrapyramidal syndromes predominate there is little scope for treatment; prognosis is, therefore, the principal question on which advice will be sought. While in all of them the prognosis as regards function is bad, the prognosis as regards life varies considerably in the different forms. In *hepato-lenticular* degenerations (Wilson's disease, pseudo-sclerosis) the children are cachectic as well as crippled; many of them die in childhood and comparatively few survive adolescence. The outlook for their bodily activities is entirely bad; they become disabled by rigidity and contractures. Some degree of dementia is likely to ensue. These cases are, however, rare in comparison with the *athetoses*, of which at any rate a large number are progressive. In them the general health is not impaired, and life is not endangered, except in that the child may be prevented by them from leading a healthy life and susceptibility to disease be thereby increased. Most of them survive adolescence, and they are commonly met with in the twenties and thirties, but their expectation of life is probably well below the average. From the point of view of their activities the outlook depends very largely on whether the athetoid movement and spasmus mobilis are unilateral or bilateral. In double athetosis it is very bad; walking is always difficult and may become impossible, and it is extremely difficult to prevent contractures and joint changes. In all but the mildest cases it is impossible to train the hands to any useful activities. On the other hand, in hemi-athetosis it is often surprising how much the child learns to overcome the disability, both in walking and in the use of the hands. It is worth while persevering in manual training, and at a later stage some assistance may often be obtained from operative measures. There is no essential mental defect in athetosis, and many of these children are remarkably intelligent. Some are defective as the result of associated cerebral lesions, and in them the prognosis is bad from all points of view.

Of other severe paralyses of early childhood—Hoffmann-Werdnig disease, amaurotic idiocy, Schilder's encephalitis—little need be said. They are invariably fatal, the first two usually within a year and the last within two or three.

Paralyses due to Residual or Recoverable Lesions

The most important of these are diplegia and hemiplegia.

Diplegia is merely a syndrome and may be due to a variety of causes. Some cases are progressive and usually die in infancy. But most are not progressive, and in them the prognosis is of great practical importance. In my view it is more favourable than has been generally recognised, but it depends almost entirely on the treatment provided. In these children the power of standing and walking does not develop spontaneously, and cases which are left to their own devices nearly always deteriorate.

Certain complications of diplegia render the prognosis unfavourable whenever they occur. These are frequent convulsions persisting beyond infancy; a true degree of amentia, apart from retardation; severe athetoid movements. In the absence of these complications the main points in prognosis are the severity of the spasm and the age at which suitable treatment is begun. If a case of moderate severity is seen during the second year the outlook may be presented as follows.

Under continuous treatment it is likely that the child may be taught to walk in a frame by 3½ or 4 years, to push a doll's perambulator by 4 or 4½, and to walk alone by 5 or 6. It must not be expected to talk before 4, and there may be some dysarthria for several years more. Only in a few cases will the gait become quite normal, but in many it will eventually approximate to the normal. It is impossible to assess the mental possibilities at this age, and one must be prepared for some disappointments in this respect. A greater proportion of these than of normal children will die of intercurrent disease, but the percentage is not a very high one.

When these patients are seen later in childhood, after being allowed to drift into contracture, or being treated by faradism, the prognosis is much worse. Nevertheless, provided that the mental state is not one of apathy, some improvement can nearly always be obtained.

In *hemiplegia* the prognosis is much better than in diplegia. One side of the body develops its activities normally and the child usually learns to walk spontaneously, though with a limp. The arm, on the other hand, may become useless. If early treatment is instituted one may expect to render the affected leg almost normal. In the arm, supination will probably be incomplete, and power less than in the other, but the resulting disability may be quite a slight one.

Of other non-progressive paralyses *amyotonia congenita* and *diphtheritic neuritis* may be taken as examples. In the former the prognosis should be guarded owing to the high mortality from respiratory disease. But a good prospect of recovery may be held out for those who escape this danger.

In diphtheritic paralysis the prognosis is entirely good, complete recovery occurring without special treatment.

NEILL HOBHOUSE, M.D., F.R.C.P.,
Assistant Physician, West End Hospital for Nervous
Out-patients,
Children.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. W. J. Morris to *Valiant*.

Surg. Lt.-Comdrs. R. R. Baker to *Drake* for R.N.B. and to *Hermes* (on recommg.); R. L. G. Proctor to *President* for course; J. M. Sloane to *President* for course; and G. A. Miller to *Pembroke* for Harrier, for trials.

Surg. Lt.-Comdr. (D.) W. E. L. Brigham to *Tamar* for Hong-Kong Hospital.

Surg. Lt. S. J. Savage to be Surg. Lt.-Comdr.

Surg. Lts. D. A. Hovenden to *Encounter* and to *Drake* for R.N.B.; T. F. Davies to *Drake* for R.N.B.; J. W. L. Crosfill to *Dolphin*; S. Gay French to *Drake* for R.N.B., and to *Hermes* (on recommg.); and C. Ommanney-Davis to *President* for course.

Surg. Lt. (D.) A. M. Watson to *Drake* for R.N.B.

Surg. Lts. (Short Service) E. D. Caldwell, P. K. Fraser, A. J. Glazebrook, W. A. S. Grant, D. P. Gurd, E. James, R. M. Kirkwood, J. W. Rhys, R. F. Stenhouse, and G. D. Wedd.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. A. C. Howard has resigned.

Proby. Surg. Sub-Lts. J. B. W. Hayward to *Drake* for R.N.B.; and W. H. Osborn to *Cairo*.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. G. W. W. Ware, D.S.O., having attained the age for retirement, is placed on ret. pay.

Maj. C. Crawford-Jones to be Lt.-Col.

Lt. T. D. Phelan to be Capt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Maj. W. T. Gardiner, M.C., having attained the age limit, retires, and retains his rank, with permission to wear the prescribed uniform.

ROYAL AIR FORCE

Squadron Leader (Hon. Wing Comdr.) E. Huntley, O.B.E., relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Wing Commander.

Flight Lt. (Hon. Squadron Leader) E. E. Isaac, M.C., relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

Flight Lt. F. W. P. Dixon to No. 33 Squadron, Bicester.

Dental Branch.—Flight Lts. W. D. Guyler to R.A.F. Depôt, Uxbridge; V. H. Weekes to Station Headquarters, Upper Heyford.

INDIAN MEDICAL SERVICE

The undermentioned appts. are made: To be Lts. (Temp. Commn.): Manohar Singh Chadha, Wahajuddin Ahmad Mirza, Abdul Haq, and Maung Maung Gyi.

Lt.-Col. I. D. Jones retires.

SPECIAL ARTICLES

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF NEUROLOGY, PSYCHOLOGICAL MEDICINE, AND MENTAL DISEASES

At the final meeting of this section, Mr. NORMAN DOTT (Edinburgh), vice-president, being in the chair, Prof. DAVID WATERSTON (St. Andrews) opened a discussion on

Pain

Interest in pain, he said, was not confined to the medical world; philosophers and ecclesiastics had pondered over it. Much of the discussion had dealt with its "protective" aspect, but he did not think any good purpose was served by philosophising about this. Pain in some instances served a useful purpose by warning against agencies to be avoided or by deterring the sufferer from attempting physical exertion which would be harmful to the condition underlying the pain. But this principle was not a universal one. The sufferer from renal colic was warned by his pain neither what to avoid nor what to do to ease it. Moreover, pathological changes might take place in the body—*e.g.*, severe arterial degeneration—without a hint of pain. Like other forms of sensation, pain could be defined only in terms of itself, just as visual phenomena could be described only in terms of sight and were unappreciable by those who had never seen. Pain was different from a mere unpleasantness of sensation. It was so varied in its forms and arose apparently from so many different causes that it might appear almost hopeless to discover the underlying mechanism. We did not know what were its nerves or, indeed, whether it had its own nerves or not, nor whether the "centre" was in the thalamus, if there was a "centre." The ordinary means of physiological experiment were scarcely applicable to the study of pain; man himself must undergo experiment. It was difficult to imagine that pain was ever due to impulses along nerves of other forms of sensation.

The mechanism of pain production might be studied in two successive steps. The first was to determine the tissues and organs that could give rise to pain, and the second the effective stimulus in each of them. It was well recognised that different structures were entirely different in their pain responses. In a case of prolapse of the rectum, the prick of a pin near the anal orifice was painful but on the mucous membrane no pain whatsoever was elicited. The problem of visceral pain presented special features, and would not be understood until we knew more about "somatic" pain. His own experiments were devised to test whether pain could be produced by direct mechanical stimulation of different tissues. The stimulus used was a sharp needle. When the needle was inserted no pain arose from the epidermis; the dermis gave an immediate and acute response; subcutaneous tissue was less responsive but nevertheless in subcutaneous tissues there was a pain mechanism; fibrous tissues were responsive, especially the aponeurosis of muscle. The walls of veins were almost insensitive, but arteries gave a very acute, severe, and sickening response. Striated muscle gave a dull sensation like pressure. Periosteum often gave no response and bone was insensitive to this kind of stimulation, but stripping periosteum from bone was definitely painful. The response of muscle was specially instructive, yet severe pain could be produced from muscles which contracted without having a proper blood-supply, and Sir Thomas Lewis had shown that the pain was due to the production locally of a chemical stimulus which he termed the "p substance." There were reasons for supposing that a chemical agent might be the stimulus for pain in other tissues.

The term "referred" pain was not a good one, since all pain was referred by the sufferer to some place. The point of distinction between the two kinds of pain was that in one the pain was localised by the sufferer at the place where the disordered process was at work, while in the other it was referred to some distant region. For the former he suggested "homotopic," while for the latter, in contrast, we might apply the term "heterotopic." There were difficulties in accepting Mackenzie's theory in all its details. The close similarity between the area of pain and tenderness due to local causes and one of visceral pain and tenderness made it extremely probable that the same underlying condition was present in both of them. The speaker had found that an area of muscular pain and tenderness might be abolished by the local injection of a small amount of normal saline, which presumably helped to get rid of the "p substance." Dr. Forman had found that normal saline injected into the painful and tender areas of "heterotopic" visceral pain acted in the same way and gave relief. He thought it would be found that in such areas there was formed the same pain-producing substance as that formed in areas of pain from local conditions.

Mr. JOHN MORLEY (Manchester), who confined his remarks to abdominal pain, said that the gastro-intestinal tract was insensitive to mechanical stimuli which produced pain when applied to the surface of the body, but the parietal peritoneum was acutely sensitive. Certain features of the visceral afferent nerves justified us in regarding them as different in function from the somatic sensory nerves. He did not believe that visceral pain was referred to the abdominal wall by means of a spinal reflex. In any case of early acute appendicitis we could predict with the greatest confidence the exact position in which the inflamed appendix would be found by noting the point of maximum deep tenderness and muscular rigidity. If this pain was referred from the viscus it would certainly be constant in position and not vary as it did with the position of the appendix. It was important to realise that pain produced by stimulation of the parietal peritoneum was not felt in the peritoneum itself but was radiated to the more superficial branches of the somatic sensory nerves which supplied the affected area of the peritoneum.

Dr. MACDONALD CRITCHLEY (London) discussed the psychological concomitants of pain and susceptibility to pain. Preoccupation with the pain was a very constant feature, but other concomitants varied with the circumstances. The patient's sense of time was disorganised. Mental depression and pain hardly ever went together. In certain patients pain seemed to give rise to stimulation of the special senses and most commonly aroused the sense of colour. Susceptibility to pain was increased by refinement and education. There were rare individuals who seemed to have no susceptibility to pain. They were naturally analgesic. One such man appeared on the stage as elicited. The spasm occurring in an artery already partly occluded by atheroma probably interfered with the flow and led to local thrombosis.

Dr. H. McPHEDRAN (Toronto) drew attention to other lesions which gave rise to pain in the chest simulating coronary disease, notably lesions of the gall-bladder. The history in these cases frequently gave a clue to the origin of the pain. Two cases which he had recently seen with abscesses in teeth made him wonder whether infection had some bearing on sudden coronary occlusion.

Dr. GRANT, in replying, said that he could not agree with Prof. Duguid that atheromatous arteries were not narrowed; and he mentioned the effects of disease in the arteries of the limb where reduction of the circulation could be proved. Turning to Dr. Bourne's remarks he said that the angina of effort and that of thrombosis were both associated with cardiac changes which could be demonstrated post mortem. Cases did arise in which infarcts of the heart were present without atheroma of the arteries, and in such cases spasm probably played a part, but a diagnosis of spasm should not be made too lightly.

Dr. JOHN McMICHAEL (London) read a paper on

The Pathological Basis of Splenic Anæmia

He suggested that splenic anæmia as first described by Gretsel must have included a variety of separate pathological states, including acholuric jaundice, Gaucher's disease, and even aleukæmic leukæmia. He had found that a group of 96 cases of clinical splenic anæmia included achlorhydric microcytic anæmia, leuco-erythroblastosis, and reticulo-endotheliosis, but by far the most common condition was hepato-lienal fibrosis, which includes both cirrhosis of the liver with splenomegaly, and pre-cirrhotic splenomegaly. The spleen in the latter condition was characterised by the effects of venous congestion in addition to proliferative changes.

PUBLIC HEALTH

The Major Fevers of Children: their Recent Trend

IN an analysis based upon the Registrar-General's statistics for England and Wales during the past 75 years the health department of the League of Nations[1] considers the trend of mortality of the four major acute specific infections of childhood: diphtheria, scarlet fever, [illegible] measles. Two main points emerge [illegible]: (1) the great decline in the total number of deaths caused by these diseases; and (2) the alteration in the proportion of deaths due to each of them. If the death-rate of children under 15 from each of these diseases be taken as 100 for the quinquennium 1856–60, and compared with the rates for the quinquennium 1926–30, the decline in the death-rate from diphtheria is 78 per cent; from scarlet fever, nearly 98 per cent; from whooping-cough and measles, 72 per cent. and 68 per cent. respectively; and from all four together, nearly 82 per cent. Diphtheria antitoxin was introduced in 1895, and it is therefore not surprising to learn that an accelerated fall in the death-rate from this disease dated from that year, but no such specific cause can be assigned for the great decline in the number of deaths from scarlet fever. An antitoxin was not available until about 1925, whereas Hilda M. Woods[2] showed that about 1880 "some change occurred and mortality definitely declined and has continued to do so." For the quinquennium 1926–30 the death-rate from scarlet fever among children under 15 was 5·5 per 100,000, compared with 220 for the quinquennium 1856–60. Woods points out, however, that the present low level may be merely the trough of a wave. The decline in the mortality from whooping-cough also commenced about 1880 and has also been continuous; that from measles fluctuated until 1915, but since then has shown a rapid decline. In the earliest registration years scarlet fever caused nearly 40 per cent. of the total deaths attributed [illegible] these four major infections; from 1916 onwards [illegible] proportion has fallen to 6 per cent. The share [illegible] diphtheria until 1890 averaged about a fifth, but sin[illegible] then it has risen to about a [illegible]er. In the midd[illegible] of last century whoopin[illegible]d measles wer[illegible] each responsible for about [illegible]e, whereas now the share of each exceeds a third. Thus although the actual number of deaths caused by these two diseases has fallen very greatly during the past three-quarters of a century, their relative lethality amongst the four specific infections has become enhanced.

There is no evidence that the decline in mortality from diphtheria and scarlet fever has been coincident with any comparable decrease in prevalence, in spite of a high hospitalisation rate for both diseases over many years. Diphtheria in 1933 was very prevalent in Great Britain, especially during the last quarter, and in some parts of the kingdom was of a severe clinical type possibly associated with the *gravis* strain of the bacillus. In England and Wales[3] there were 47,435 notifications and 2646 deaths; in Scotland[4] 8843 notifications and 356 deaths. In England and Wales the number of notifications of scarlet fever was the highest since 1921, "but the number of deaths substantially less than in that year"; in Scotland the number of notifications (38,887) "far exceeded the highest number recorded during the last 30 years." The disease was accountable for 729 deaths in one division of the kingdom and 310 in the other.

Diphtheria is definitely preventable and the recent figures are a reproach. Scarlet fever is also preventable, and it may be noted that in Zetland the county medical officer is of opinion that a scheme of Dick-testing and immunisation which had been introduced in recent years "contributed in no small measure to the abatement of the scarlet fever outbreak." Active immunisation is the only feasible way of reducing the incidence of these two diseases. Diphtheria takes a constant toll of some 3000 children's lives annually. Scarlet fever, although a shadow of its former self, is responsible for an enormous amount of illness even in inter-epidemic phases, whilst its periodical epidemicity results, as it did last year, in the resources of public health authorities being strained to breaking point owing to the insistence of the public upon hospitalisa[illegible] which, more often than not, is unjustifiable upon [illegible] preventive or curative grounds. Diphtheria and [illegible] fever are compulsorily notifiable and although [illegible]usion of "[illegible]riological diphtheria" tends to [illegible]e real f[illegible] in the one case and the [illegible] of c[illegible] unrecognisable types [illegible] ggerate it in the other, the ratio of morbidity to tality can be assessed with fair accuracy. On the r hand, neither the morbidity nor the true mor- y from whooping-cough or measles is really wn. Notification of these diseases, if in force at all, cal and usually partial, and it is well recognised in measles, especially, death is apt to be ascribed roncho-pneumonia to the exclusion of the ante- nt specific infection. Last year measles in Great ain was in its inter-epidemic phase, and although experience of Scotland was exceptionally favour- —there were only 36 deaths—the disease was the stered cause of death of 1937 children in England Wales. We learn from the English report that prevalence of scarlet fever, already noted, con- ed in the early part of 1934, and then coincided a substantial increase in the prevalence of, and, btless, deaths from measles. It is evident too the League of Nations report that the biennial rge of measles did not spare Scotland in the first ter of this year, since partial notification revealed 5 cases and there were 89 deaths.

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[1] Epidemiological Report (Ma[illegible] 73. 1s. 9d.

[2] Med. Research Council, Spe[illegible] 180. 1933. H.M. Stationery Office. 1s. 3d.

[3] Annual [illegible] Ministry of Health, 1933–3[illegible]. [illegible], Offic[illegible]

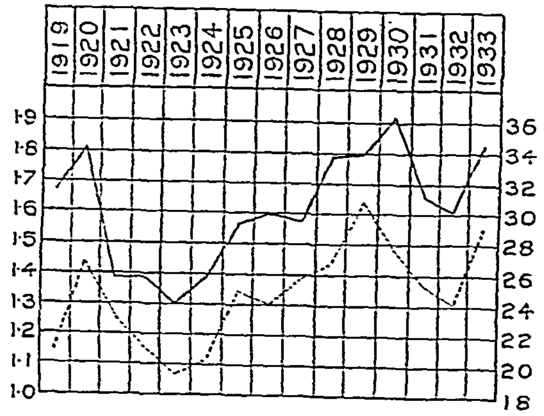
[4] Rep. [illegible]f Health for Scotland, 1933. Office [illegible]t

he ravages of measles, given an adequate supply of alescent or adult immune serum, can at least be gated, but even if allowed to run its course tenuated these ravages are not so severe in relative s of either morbidity or mortality as those of oping-cough with its long clinical course. In land and Wales last year 2270 deaths were ascribed hooping-cough, a death-rate of 5·6 per 100,000, st in Scotland it is recorded that the 762 deaths the disease were equivalent to a death-rate of er 100,000; 98 per cent. of these deaths occurred ngst children under 5 years of age. P. Stocks M. Karn[5] showed that in 1929 no less than 1141 hs from whooping-cough occurred in the area of administrative county of London alone, all ngst children under 10 years of age. This was valent to 13 per cent. of the mortality from all es at these ages. Stocks found that the London was exceptionally high, but there is evidence that oping-cough when epidemic is everywhere to be ded even more than measles. Recent work upon vaccine prophylaxis of this disease is at least nising, and it is to be hoped will be repeated upon dequately controlled scale in this country; but, e writer of the League of Nations report concludes, prophylactic campaign, even if limited to the ation of mothers, in the absence of specific unisation, cannot be started well and successfully ied out unless the importance of measles and oping-cough is realised." This unfortunately, only in this country but in most others, is far being the case.

Puerperal Fever and Erysipelas

the latest fascicle[6] of the L.C.C. report for 3, which deals with vital statistics and public th administration, Sir Frederick Menzies again rs to the upward movement of maternal mortality particularly to the correspondence in the move- t of the mortalities from puerperal fever and from ipelas among women over 20 years of age, matters which some space was devoted in his report for 3. Attention is drawn to the fallacies arising from expression of maternal mortality as a fraction of ch the numerator includes deaths at all stages of nancy of women, whether married or unmarried, the denominator only births after the twenty- th week of gestation. Statisticians are fully alive to the difficulty, but so far no better means of arriving at a measure of maternal mortality for practical purposes and general use has been devised. Sir Frederick advises London authorities to show deaths due to abortion or miscarriage separately from those associated with live or stillbirths, and, so long as no attempt is made to draw conclusions from local annual rates derived from these subdivided and necessarily small figures, the proposal ought to meet with acceptance. He also emphasises the greater risk attendant upon stillbirth than live birth and the consequent need for still further classification of statistical records. He appears to adhere to the view which he expressed in 1928 that a falling birth-rate tends to be associated with an increase in the maternal death-rate. The Registrar-General however maintains[7] "that no excuse for the lack of improvement in the maternal mortality-rate can . . . . be found in the falling birth-rate," since the decline in the relative numbers of children born in the birth ranks of high order (fourth or later confinements, presumably) compensates for the increase of the proportion of first confinements.

In London as elsewhere, puerperal sepsis accounts for about 40 per cent. of the maternal deaths, and the report points out that deaths from this infective cause are subject to greater fluctuation than those of non-septic origin. The variation of the puerperal fever death-rate in correspondence with the death-rate from erysipelas is strikingly illustrated by the figure which we reproduce from the report. The importance and wide diffusion of infection with hæmolytic streptococci has been amply demonstrated, but on general epidemiological grounds one would expect that infection of the community generally should have a bearing on the occurrence of puerperal sepsis almost, if not quite, as great as infection of the women over 20 years, unless the theory of autogenous infection is accepted. In fact, the death-rate from erysipelas at all ages closely follows the same course.



A comparison between the incidence during the years 1919–33 of (black line) puerperal fever death-rate per 1000 births and (dotted line) erysipelas death-rate per 1,000,000 among females aged 20 and over. Since stillbirths were not registrable until 1928 it must be taken that the puerperal rates are based on live births.

The Single Abattoir

In a report to the Belfast public health committee, Dr. C. S. Thomson illustrates the value of having only one abattoir in a city, and that one a municipal abattoir under the supervision of the M.O.H. An animal was killed at Hillsborough, Co. Down, some elicited. The spasm occurring in an artery already partly occluded by atheroma probably interfered with the flow and led to local thrombosis.

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[5] Jour. of Hyg., 1932, xxxii., 581.

nnual Report of the L.C.C., 1933, Vol. III. (Part I.). lic Health. London: P. S. King and Son, Ltd. 1934. 1s.

[7] The Registrar-General's Statistical Review of England and Wales, 1931. Text. Pp. 80–81.

Dr. H. McPhedran (Toronto) drew attention to other lesions which gave rise to pain in the chest simulating coronary disease, notably lesions of the gall-bladder. The history in these cases frequently gave a clue to the origin of the pain. Two cases which he had recently seen with abscesses in teeth made him wonder whether infection had some bearing on sudden coronary occlusion.

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[1] Epidemiological Report (May–June), R.E. 173. 1s. 9d.

[2] Med. Research Council, Spec. Rep. Ser. No. 180. 1933. H.M. Stationery Office. 1s. 3d.

[3] Fifteenth Annual Rep. of the Ministry of Health, 1933-3 H.M. Stationery Office. 6s.

[4] Fifth Annual Rep. of the Dept. of Health for Scotland, 1933. H.M. Stationery Office. 3s.

PANEL AND CONTRACT PRACTICE

Off with their Heads!

the course of his eighth presidential address to anitary Inspectors' Association on Sept. 4th onard Hill, M.B., F.R.S., spoke of the need for ncy and economy in the medical services paid y the State. In these respects he contrasted nce practice unfavourably with the work done spitals.

a general hospital," he said, "a patient is first y a receiving room medical officer, who sifts out ture of the case, and if the trouble be more than sends the patient, in accordance with his diagnosis, the physician, the surgeon, the eye specialist, &c. . . . mplete a diagnosis the patient has the advantage ts made in the bacteriological and biochemical ments and of examination by X rays. To aid his ry there are available the skill of the surgeon and ethods of physical medicine, manipulative surgery, ge, electricity, irradiation with light and heat, and s medicinal baths. It is not possible for [illegible] n, er qualified, to carry out anything lik [illegible] he of diagnosis and treatment. Even if he has the edge he has not the room, the expensive apparatus, e skilled assistance required."

me 80 per cent. of the troubles which lead nts to consult their panel doctor there is nothing s the matter, continued Sir Leonard; "a encouragement and nature will put things right; tle of medicine plays its part, and faith-healing the rest." But serious cases may be missed: ample, there is the abdominal pain that may be o appendicitis, and the cough that may be due berculosis. Again there is diabetes, which may erlooked, and may also be inadequately treated. ugh want of proper control "many cases of tes arrive at the hospitals in a state of coma. the statistics of the Registrar-General do not that fall in the death-rate for diabetes which d have resulted through the discovery of insulin." e panel system, Sir Leonard thinks, should be ced by one in which all medical officers paid by State are attached to hospitals, clinics, and nsaries. "The panel doctor waits for the sick me to him; he cannot go into the factories and a holiday for those who need it or make changes nditions which will lead to the prevention of se." In speaking of sickness benefit he repeated harge that "an undue proportion of sicknesses on a Saturday, and an undue proportion begin Monday."

is comprehensive indictment of the present m will find supporters both within and without profession; and it is perfectly proper that those engaged in insurance practice should sometimes to prove that they see most of the game. Not body, however, has Sir Leonard Hill's enthu- for hospitals, clinics, and dispensaries as an native to the family physician. And is the ment provided by hospitals always so much rior? As at present constituted they are largely d by junior men who are gaining experience e going out to practise on their own responsibility metimes as panel doctors—without the shelter ded by the name of a great institution. Anyone has been resident in them will remember errors dgment or practice which never came to light; yet all their privacy there are sometimes complaints. pitals, in fact, make mistakes like everybody but there are no medical service subcommittees quire into them. They have come to occupy sition of great privilege, and it is galling to etent practitioners to find that what a junior nurse at a hospital says about the condition of a patient—"he ought to have been sent to hospital before . . . &c."—is always accepted by the public. At the same time there are signs that the approved societies are now beginning to realise that certificates obtained at hospitals have no more intrinsic value than those of external practitioners—and sometimes not so much.

As for the old remark about illness ending on Saturday and beginning on Monday, Sir Leonard Hill must remember that all the professional bodies from the Insurance Acts Committee downwards have done their best to persuade doctors to sign patients off the funds as soon as they are well. But anyone who has tried to do it knows the difficulty that immediately crops up. Employers are very loath to restart a man at work in the middle of a working week. Suppose that a cut finger is definitely dry for the first time on Wednesday, with the scar healed but tender. The new week starts on Friday. It would be interesting to hear how often Sir Leonard would sign the man off on Wednesday, knowing that the employer would not have him back till Friday—especially if the patient told him the scar was still tender and painful. The fact that illness often starts on the beginning of the week is usually due to the desire of the man to carry on as long as possible; he works the last part of the week when he ought to have ceased earlier. It really seems to have very little to do with the merits of the panel system.

It is true, of course, as Sir Leonard Hill says, that a large proportion of patients have nothing serious the matter with them; but he is surely aware that a primary object of the Act was to induce people to consult their doctors in the earliest possible stage of an illness, before serious trouble arises; and according to him they are doing it. He produces no evidence that serious cases are missed, and the statistics of complaints made to the medical service subcommittee show that errors of diagnosis are not at all common—a conclusion which was amply borne out by the report of the last Royal Commission.

A Dilemma

Two weeks ago in this column we printed the draft letter regarded by the Insurance Acts Committee as a proper one for the secretary of an approved society to send to the insurance practitioner who has certified one of its members as being incapable of work. We noted the difficulty of answering such a letter without infringing professional secrecy. The doctor who considers his reply merely as another report to write may find himself on the horns of a dilemma. If he answers "yes" the case will be referred to the regional medical officer and the doctor lays himself open to the question why he has not himself referred it before. The society's letter is, however, designed to avoid references. If he says "no," but fails in "other observations" to convince the society of the futility of a reference, he must tell the patient that he informed the society that a reference was not necessary but was overruled. Actually the only possible answer is "yes," but to the society alone. For whereas the patient stands to lose sickness pay if found capable and has all the trouble and inconvenience of attending the centre for examination, and whereas the doctor risks having his judgment reversed—to say nothing of the extra work of writing reports and the bad mark if they do not arrive in time—the society may gain up to 15s. a week through cessation of sick pay, at a cost of

1s. 6d. for the reference. The advantage is in fact wholly on the side of the approved society. In regard to the "other observations," if the reply is limited to an estimated prognosis of the return to work made in agreement with the patient, the doctor will probably be on safe ground in giving this help to the society, but the form of words used should be not such as to brand him as being professionally incorrect if subsequent facts do not bear out his estimate. In any case he would need to be very careful not to give the society any information which might be damaging to the patient, without his consent. This is probably the reason why the diagnosis of gastritis or anæmia is often used in the certification of pregnant young girls at the present time. If the patient discloses the condition to the society it does not matter, but if the doctor does so, even on the certificate which is handed to the insured person to give to the local agent, in a small village area the news would be around directly and the doctor would be blamed by the public although not legally culpable. It may require all Dr. Dain's persuasive eloquence to convince the panel conference that the letter should be agreed to in its present form.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

HOUSING AND TUBERCLE

THE Royal Sanitary Association of Scotland, which held its diamond jubilee this year at Stirling, has come to be accepted by the local authorities as setting the general standard for sanitary work in the country and providing an occasion for ventilating the large problems of public health. Its history has been bound up intimately with the development of the public health authorities. At this congress discussion turned on tuberculosis. In his presidential address Mr. Allan W. Ritchie commented on the importance of colour in house decoration; former drab, heavy, dust-collecting draperies and dismal wall colourings had given place to surfaces of lighter and brighter hue. Industrious housewives had demonstrated the uplifting effect of harmony in colour, but much remained to be done by the effective use of colour—flowers, shrubs, hedges, and trees—in dispelling the gloom of urban conditions. He wished to correct an impression which had gained an astonishing currency (e.g., the bath used as a coal bunker *statim*) that slum-dwellers transferred to a new housing scheme took no more than a year or two to reduce their new dwellings to a level with the old. The proportion who failed to respond to their new surroundings was actually not more than 4 or 5 per cent.

A sketch of the working of the Glasgow tuberculosis scheme for the last 20 years was given by Dr. R. J. Peters. The annual cost of this scheme, about £235,000, was, he said, relatively high because of the liberal hospital accommodation needed to counterbalance the low standard of housing and the overcrowding in the city. In Glasgow each tuberculosis case cost the ratepayers about £100 for treatment and supervision. Sanatorium and municipal hospitals had in the past resulted largely in divorcing tuberculosis from general medicine. But now with the clinic system the work of tuberculosis officers was broadening out to an extent undreamt of when the schemes were inaugurated. Prof. Carstairs Douglas congratulated Stirling county and burgh on their milch herds. Of 132 biological tests on individual cows from Stirling he had, up to June last, only found two positive. Dr. G. V. McMichael (Paisley), presid elect, spoke of the need for a definite policy on hou tuberculous families in industrial areas. Of cases investigated during the last five years 63 cent. shared a bed, another 21 per cent. shared a ro and only 15 per cent. were the sole occupants of room. In the light of such conditions his l authority decided to make a special effort, and du the last three and a half years 182 tubercu families, or 21 per cent. of the registered cases, been rehoused. In future housing schemes 15 cent. of the houses were to be allocated to tubercu families, the rents being kept below the usual £12, and £16 respectively for 2, 3, and 4 apartment hous

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

THE annual report of the Council of the Ro Australasian College of Surgeons which has been published announces the election of Mr. H. Devine, of Melbourne, as vice-president, to fill vacancy caused by the retirement of Sir Alexan MacCormick. Mr. Alan Newton, of Melbourne, appointed censor-in-chief, in place of the lat Hamilton Russell. The Council further reports creation of training posts for young surgeons assistants to in-door surgeons at various hospit and the establishment of a hospital for post-gradu teaching. This hospital, to be known as the "Fri George Hospital," Melbourne, was formerly homœopathic hospital, and its change of title scope is the result of negotiations between the coun of the College and the authorities of the hospit The College building in Melbourne will be opened Sir Holburt Waring, the president of the Ro College of Surgeons of England, in March, 19 when the next annual general meeting of the Coll will be held. At the last meeting, held in Adelai from Feb. 28th to March 3rd of this year, about o hundred Fellows from all States of the Commonwealt attended. It was opened by the Governor of Sou Australia, and after the formal admission of 15 ne Fellows an address on the origin of the College, i aims and its objects, was delivered by the presiden Sir Henry Simpson Newland.

PRIMARY FELLOWSHIP EXAMINATION IN AUSTRALIA AN NEW ZEALAND, 1934

Candidates for the primary examination for th diploma of Fellowship of the Royal College of Surgeon of England will be able to sit for it in Melbourne i November and in Dunedin, New Zealand, in Decembe next. This is the second occasion on which th examination will have been held in Australia. Pre viously only graduates were allowed to take th examination, but now special arrangements hav been made to allow senior students to do so. Th date of the examination coincides with the latte part of the examinations in anatomy and physiolog at the University of Sydney, and the faculty o medicine of this university has agreed to make specia arrangements for those students who wish to sit fo the primary examination at Melbourne, when Mr G. Gordon Taylor and Prof. G. A. Buckmaster will act as examiners in respectively anatomy and physiology. Special classes have been arranged in both Melbourne and Sydney by the local post-graduat committees. It is understood that there will be about 60 candidates for the examination from Australia and 25 from New Zealand.

CORRESPONDENCE

ERYTHEMA NODOSUM

To the Editor of THE LANCET

—My experience with erythema nodosum of reptococcal type answering at once to a single f antistreptococcal serum is in complete agree-with that of Dr. Slot in your last issue (p. 600). e other hand, I must challenge his remarks on equency of streptococcal erythema nodosum as ed to tuberculous erythema nodosum. Certainly ldren the latter is many times as frequent, and uite an exception to find a case of streptococcal ema nodosum in childhood. Before treating iven case, it is wise to do a Mantoux tuberculin /1000) and, if possible, a streptococcal endotoxin utaneous test. The underlying cause of the ular case then becomes obvious and the priate cases for antistreptococcal serum can be l out.—I am, Sir, yours faithfully,

DONALD PATERSON.

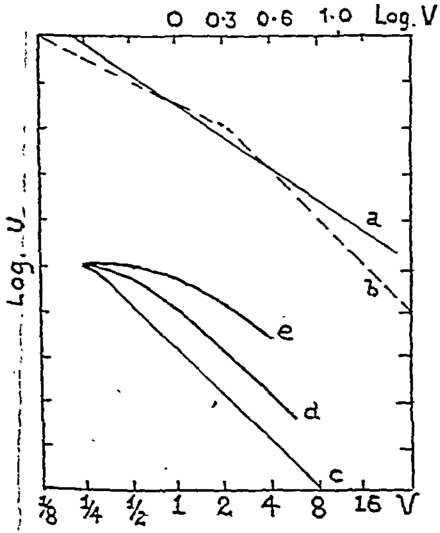
shire-place, W., Sept. 15th.

THE UREA-CLEARANCE TEST

To the Editor of THE LANCET

Dr. Hinden's paper on the urea-clearance our issue of Sept. 8th leads us to draw attention mpler method of evaluating results—viz., e use of graphs.

ence Ambard's and van Slyke's tests are on an assumed normal relationship between -urea concentration in milligrammes per litre (B), ry urea concentration (U), and the secretion-in cubic centimetres per minute (V). It is ised that, when kidney efficiency and B are ant, V varies reciprocally as some power of U. can be put to the proof by the usual method of sis. Given a series of data satisfying the above



U (urinary concentration of urea) plotted against $\text{Log}_{10}V$ m. urine per minute): (*a*) on the basis of Ambard's mula, assuming a normal fixed value for the blood-urea, $V' = K_1$; (*b*) on the basis of van Slyke's formula, assuming ormal fixed value for the blood-urea, $U^2V = K_2$ (when $V < 2$); $= K_3$ (when $V > 2$). (*c*), (*d*), and (*e*) are curves from the ters' observations, showing the effect of increasing the oad" of the

aph of log U : log V should be haracteristic slope.

ding respectively to Ambard's ke's law (*b*) are shown in the accompanying Figure. For different fixed values of B, the graph as a whole will move vertically upwards and downwards. On the other hand, observations[1] suggest that the natural graph is seldom linear, but varies both in form and in situation with the load imposed upon the kidneys (represented by B). In the Figure *c*, *d*, *e* show the type of change to be expected as the load increases. Further, as kidney efficiency declines, the situation of the curve tends to fall and the horizontal flattening to become more pronounced. For clinical purposes, therefore, a series of normal curves for different values of B would provide a more reliable standard than a rigid algebraic formula, and since the coördinates could be calibrated directly in plain figures (as the Figure shows for V), calculation of logs would be unnecessary. The criterion of normal relationship would then be whether the readings for secretion-rate and urinary urea concentration fall on the corresponding normal curve.—We are, Sir, yours faithfully,

A. R. MCCLURE,
C. P. STEWART.

Clinical Laboratory, Royal Infirmary, Edinburgh, Sept. 17th.

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RADIOLOGY IN GENERAL PRACTICE

To the Editor of THE LANCET

SIR,—From the standpoint of a qualified radiologist doomed to general practice I hasten to refute Dr. Monteith's letter in your last issue, and to give whole-hearted support to the statement uttered at the recent B.M.A. discussion that "the general practitioner who purchased an X ray outfit was likely to become a menace to his patients." As a student in 1925 I heard Dr. W. J. O'Donovan, dermatologist to the London Hospital, describe cases of lupus and other skin diseases which he had seen converted to epithelioma by ardent practitioners possessing X ray outfits. The mere installation of an X ray outfit never brings automatically to the installer a sound knowledge of radiology. One might as well purchase a copy of the Koran and automatically consider oneself to be a Mohammedan mullah.

During eight years of general practice I have seen the following mistakes made by well-qualified medical men who considered themselves fit without adequate training to interpret radiograms.

1. Describe as fractures the overlapping shadows of the metatarsal and metacarpal bones.
2. Fail to recognise a crack in a bone, where there was no displacement or deformity (several cases).
3. Consign to institutions for surgical tuberculosis, as tuberculous hips and spines, cases where the radiograms were quite normal.
4. Read into normal radiograms the tentative clinical diagnoses.
5. X ray cases of pregnancy and fail to interpret twins owing to improper technique in radiography.
6. Misuse the X ray apparatus by imagining that the X ray will *directly* reveal carcinoma in such glandular tissues as the breast and the liver.

Finally during a long association with manufacturers of X ray apparatus, I have culled the information that some general practitioners install X ray outfits to attract attention much in the way that the chemist puts large bottles of coloured water in his shop window. The exhibition of the apparatus is calculate to elicit praise and advance prestige where no is due. I am, Sir, yours faithfully,

Pinwell, Slough, Sept. 15th. N. C. HYPHER

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[1] McClure and Stewart: Edin. Med. Jour., 1933, xl., 40

"NATURE AND NURTURE"

To the Editor of THE LANCET

SIR,—In a recent notice of my book your reviewer expresses alarm lest my antipathy to eugenics, and repeated emphasis on the interaction between the gene and its environment, may promote the belief that human genetics is a purely academic pursuit which has no practical contribution to make to preventive medicine. The object of the William Withering lectures was to look beyond the false antithesis which has been endorsed by philanthropic environmentalism and eugenic calvinism. In its place I tried to put the modern view which envisages the gene as an agent in the process of development interacting with the environment at every stage. Far from robbing the pursuit of human genetics of any social utility this conception enlarges our appreciation of the constructive contribution which it may make as our knowledge advances.

The eugenic view is that the practical importance of human genetics resides in selection—that is to say, discouraging persons with certain genes from parenthood by legislative acts or social pressure. This would restrict the practical usefulness of human genetics to extreme disorders, and I cannot believe that the busy house physician to whom your reviewer refers is likely to be encouraged to undertake searching inquiry into the genetic factors in disease if sterilisation is the only object in view. The alternative view which is implicit in every page of my book is that the more we find out about the hereditary background of disease the better shall we be able to prescribe a regimen of healthy living. I doubt if your reviewer would wish to increase the difficulty of maintaining a population which already has a gross reproduction-rate below unity by advocating the sterilisation of people who have the misfortune to be suffering from an infection of the frontal sinus. At the same time, I feel confident that he would not dismiss the possibility that genetic factors play some part in deciding whether one individual is more likely than another to get such a disorder.

From the narrow standpoint of eugenics knowledge of that kind would be utterly useless. From the standpoint which I have presented it would be an essential piece of practical information. If we had such knowledge we should be in a position to warn people who are liable to suffer in that way, and advise them about the necessary steps to take in order to avoid trouble for themselves.

I am, Sir, yours faithfully,

LANCELOT HOGBEN.

University of London, Department of Social Biology,
Sept. 17th.

URETERO-COLOSTOMY

To the Editor of THE LANCET

SIR,—Owing to absence from London I have only just seen Mr. John Everidge's account of his technique in uretero-colostomy in your issue of Sept. 1st (p. 483). He concludes by saying:

> "This technique of delivery of the catheter appears simple and easier than other methods in use in Coffey No. 2—i.e., by attachment to gauze packing in the bowel, manipulation of the catheters through a sigmoidoscope other rigid tube, as suggested by Nitch and Green-mytage, which remain in situ during the operation."

is suggests that I advocated packing the rectum h gauze. As a matter of fact I have never used method, as I considered it too complicated and thy, and Coffey, who originated it, gave it up e before his death. In the method I described a lead tube (not a sigmoidoscope), curved to fit hollow of the sacrum, is passed by an assistant wit altering the position of the patient, after the abd has been opened and the operative field prep This serves as a support on which the peritoneal muscular coats of the bowel can be divided easily. The tube is then drawn down until the e. mucous membrane of the rectum is stretched its opening. The mucous membrane is punctured a tenotome and the catheter, attached to the u in accordance with the Coffey No. 2 technique, through the opening and down the tube, to be gr. by the assistant and pulled further down until ureter is drawn into the bowel to which it (the is attached by a suture which does not enter lumen of the bowel. The method is therefore st aseptic, and was specially devised for this pu

I cannot agree with Mr. Everidge's claim that method is simpler or easier, and it is certainly completely aseptic, for he first passes a straight (the sigmoidoscope), then a rubber bag, then i the bag, then deflates it, and finally passes withdraws a needle via the peritoneal cavity, t the contaminated wall of the bag. All s interested in this operation have been endeavo to simplify it and lessen its dangers, but with deference to Mr. Everidge's well-known skill ingenuity I do not consider his operation fulfil desiderata. In the endeavour to meet them m I have reverted to the Mayo modification of Coffey No. 1 operation, which is simple, rapid in my experience, more satisfactory than the with catheters. The only disadvantage is t not applicable to simultaneous bilateral tr tation.

I am, Sir, yours faithfully,

Harley-street, W., Sept. 15th. CYRIL A. R. N

MEDICAL NEWS

Chemists' Exhibition

The forty-third Chemists' Exhibition will be held at new hall of the Royal Horticultural Society, Grey street, London, S.W., from Sept. 24th to 28th.

Society of Public Analysts

The next meeting of this society will take place Wednesday, Oct. 3rd, at the Chemical Society's Burlington House, Piccadilly, London, W., at 8 P when Dr. G. Roche Lynch will read a paper on the mination of lead in biological material with sp reference to bone. The hon. secretary is Dr. Lynch may be addressed at the department of chemical patl St. Mary's Hospital, London, W.2.

Royal Sanitary Institute

The institute has arranged a sessional meeting Finchley on Friday, Oct. 5th. At 3 P.M. the members inspect the Finchley open-air swimming pools in the North-road, and at 5 P.M. papers will be read on Finchley swimming pools by Mr. P. T. Harrison, and the purification of swimming-bath water by Dr. A. Turner, the medical officer of health.

A sessional meeting will also be held at Sunderland Friday, Oct. 12th, when Dr. A. Stuart Hebbleth the medical officer of health, will op vermin and slum clearance. A sec anæmias and preventive medicine is t Dr. H. A. Cookson, the borough pathologist.

Opening of the Medical School

The inaugural address at G school will be delivered by Mr. C. F Oct. 3rd, and not as stated in our before the address, Lord Nuffield

OBITUARY

ILLIAM HENRY TRETHOWAN, M.B.Lond., F.R.C.S. Eng.

HE sudden death of Mr. W. H. Trethowan at the ht of his professional career has come as a shock to his colleagues and to his many friends outside pital circles. He left for his annual holiday in early part of August, and died after a short ss on Sept. 12th while he was on a visit to Sweden. illiam Henry Trethowan was a Cornishman of d personality. He was born at Cawsand in 1882, son of Mr. W. H. Trethowan, and was educated the High School, Devonport, and Plymouth hnical College. He went to Guy's in 1901 with unior entrance scholarship which was of great help to him, his financial resources being slender. He qualified M.R.C.S. Eng. in 1906, and in the same year was awarded the gold medal in the final M.B., B.S. Lond. examination. He held a succession of junior resident appointments at Guy's, among which was the post of house physician to Dr. Newton Pitt. In 1908 he was appointed resident medical officer to Bright ward (for paying patients) for two years before becoming resident surgical officer. He took Fellowship of the Royal College of Surgeons 1912, and in the same year was appointed geon in charge of the newly constituted depart- nt for orthopædic surgery at Guy's. From s time on his interest in orthopædics increased til this branch of surgery became his life work. ring the war he served, as a captain R.A.M.C. (T.), the Military Orthopædic Hospital, Ducane-road w the Hammersmith Hospital), as one of the team ich, under the inspired direction of Sir Robert nes, made history in their specialty. In 1919 Mr. ethowan was elected surgeon to the Royal National thopædic Hospital, and in October of the same ar he was invited by the Metropolitan Asylums ard to become consulting orthopædic surgeon to een Mary's Hospital for Children, Carshalton, to al particularly with the cases of deformity and vanced disease of bones and joints which at that ne were seeking treatment at this hospital in reasing numbers. The facilities for observation d prolonged treatment under almost ideal condi- ns appealed to him and, notwithstanding the ny other calls on his time, he accepted the extra rk and continued it when the hospital was taken er by the L.C.C., paying a fortnightly visit of veral hours' duration greatly to the benefit of ndon's crippled children.

MR. TRETHOWAN

In his earlier years Mr. Trethowan had shown no ecial aptitude or inclination for surgery, and deed it was his intention to become a physician. He was also interested in midwifery, and this interest was fostered by his term as resident obstetrical officer at Guy's. A voracious reader, he found it easier to gather his knowledge from books than from observation of bedside practice, and his unusually good memory made it easy for him to recall and apply what he had read. He was not one of those who had a natural clinical instinct, and he often spoke in after years of his early struggles to acquire this important sense. That he surmounted his difficulties and later developed keen clinical acumen is a testimony to his hard and persistent work. Mr. Trethowan's admiration of the work of Sir Arbuthnot Lane greatly influenced his early tendencies and practice.

As a teacher Trethowan was stimulating and forceful. His boundless enthusiasm for orthopædics was infectious, and his views, sometimes unorthodox, were often expressed with vigour and conviction. His out-patient department at Guy's was always crowded, and no student who attended was likely to forget his graphic and lucid teaching. His examination of a case was thorough and careful, though his notes and findings were dictated in rapid and indeed torrential sentences. His arguments were often enlivened with quotations or deliberate misquotations, and on the blackboard which was always at his side in the department he drew adept diagrams, as well as giving personal demonstrations of some peculiar or typical gait.

As an operator he was expert and facile; his craftsmanship was superb, and his technique impressive. No detail was omitted, and yet his surgical work, although never appearing to be hurried, was actually performed with unusual rapidity and great deftness. He was especially interested in the management of difficult fractures, and was a master of the art of bone-grafting, displaying the utmost ingenuity and skill in the selection, adaptation, and insertion of grafts. The deformities of the foot and their correction was another branch of orthopædics which especially engaged Mr. Trethowan's attention. In all departments his methods were bold and determined. His private practice and his hospital work occupied most of his time. He wrote comparatively little, and seldom took part in public discussion. He contributed a chapter on orthopædic surgery to Choyce's "System of Surgery," an article on the treatment of simple fractures to Jones's "Notes on Military Orthopædics," and to the Robert Jones Birthday Volume which appeared in 1928, a paper on fracture-dislocation of the ankle-joint. In the series on Modern Technique in Treatment, published in THE LANCET from 1923 to 1928, he was represented by an article on the treatment of hammer-toe.

As a man, he was kind-hearted and generous to a fault. Everyone at Guy's knew that "Treth" was always ready to help and advise his colleagues and was particularly appreciative of the difficulti of his juniors. He was frank in criticism of wh he did not like, but his comments were nev wounding. His æsthetic sense was acute, and was quick to perceive the humour of any situat which others were inclined to take too seriou Trethowan's leisure was given over to music. younger days he was a member of the choral s of the hospital. Later in life he delight larly in playing the organ, and he lived Hospital for many years after his means justified removal to a more salubrious residential quarter in order to stay near the chapel organ. When he did move to Hampstead he built himself an organ in his own house. His family life meant much to him; he is survived by his wife and two boys.

JAMES HUNTER, M.D. R.U.I.

Dr. James Hunter, who died at Invercargill, New Zealand, on July 14th, after some months of illness, was born at Hunterstown, near Doagh, Co. Antrim, Ireland, in 1862, the son of Robert and Barbara Hunter. He was educated at the Methodist College, Belfast, where in 1881 he obtained the gold medal in mathematics. In the study of medicine at Queen's College, Belfast, James Hunter had a distinguished undergraduate career, winning a succession of scholarships and the class prizes in anatomy and surgery. He graduated as M.D., M.S., in the Royal University of Ireland in 1888, and after some infirmary experience in Belfast and a clinical assistantship at the Soho Hospital for Women, went to New Zealand and entered upon country practice at Winton, in the province of Southland. In 1892 he moved to the town of Invercargill in Southland, and there he spent his life. His professional skill and his quiet kindness earned him a considerable general practice, and his leisure was devoted to the study of certain of the basic sciences in which he maintained an active interest. In busy routine work he was a persistent student, and made time to keep abreast of progress in medicine. The year 1898 he spent in Ireland, Berlin, and Vienna in post-graduate study, being attached in Vienna to Hajek's clinic for the study of disease of the ear, nose, and throat. He last visited England and Northern Ireland before his retirement in 1924. In earlier days he was a keen fly fisherman, and, after giving up practice, he spent the summer months at Ulva, Stewart Island, where, in surroundings still in their natural state, he followed his interest in botany and developed the study of New Zealand's native trees and birds. Dr. Hunter married in 1903, and is survived by his wife, two daughters, and one son.

Dr. [illegible] Field Library
S. M. S. Medical College
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Medical Diary

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, Wimpole-street, W.

MONDAY, Sept. 24th, to SATURDAY, Sept. 29th.—WESTMINSTER HOSPITAL, S.W. Course in Medicine and Surgery. Open only to men graduates.—HOSPITAL FOR CONSUMPTION, Brompton, S.W. All day Course in Diseases of the Chest.—GORDON HOSPITAL, Vauxhall Bridge-road, S.W. All day course in Proctology.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Evening coaching class for Final F.R.C.S. Tuesdays and Thursdays at 8 P.M.—MEDICAL SOCIETY OF LONDON, Chandos-street, Cavendish-square, W. Lecture-demonstration by Dr. A. E. Clark-Kennedy on Paraplegia, at 2.30 P.M. on Tuesday.—PANEL OF TEACHERS: Individual Clinics in various branches of Medicine and Surgery available daily. Courses of instruction are open only to Members of the Fellowship.

ST. THOMAS'S HOSPITAL POST-GRADUATE COURSE.

MONDAY, Sept. 24th.—10 A.M., Dr. Yellowlees: Anxiety States. 11.15 A.M., Mr. Romanis: Modern Chest Surgery. 2 P.M., Dr. Tidy: Ward Round. 4.30 P.M., Dr. Z. Mennell: Anæsthesia.

TUESDAY.—10 A.M., Dr. Herbert: Recent Developments in Tuberculosis Work. 11.15 A.M., Prof. Dudgeon: Antiserum Treatment and its Complications. 2 P.M., Mr. Boggon: Ward Round. 4.30 P.M., Mr. Howarth: Demonstration of Cases.

WEDNESDAY.—10 A.M., Dr. Tchaperoff: Deep X Ray Therapy. 11.15 A.M., Dr. Dowling: Treatment of Common Diseases of the Skin. 2 P.M., Mr. Wyatt and Dr. Jewesbury: Cases from the Department. 4.30 P.M., [illegible] J. B. Mennell: Foot Trouble and Footgear.

[illegible]Y.—10 A.M., Mr. Rowley Bristow: Fractures and Injuries of the Upper Limb. 11.15 A.M., Dr. [illegible]: Some Difficulties in Antenatal Work. [illegible] Sir Maurice Cassidy: Ward Round. 4.30 P.M., Col. Harrison: Routine Treatment of V.D. in [illegible] Modern Clinic.

FRIDAY.—10 A.M., Dr. Elkington: Borderline Diseases [illegible] the Ear and Nervous System. 11.15 A.M., Prof. [illegible] Wesselow: Some Modern Diets. 2 P.M., Mr. [illegible] Causes and Treatment of Cystitis. (This Course [illegible] only open to former students of the Hospital.)

ST. MARY'S HOSPITAL POST-GRADUATE COURSE.

FRIDAY, Sept. 28th.—10.15 A.M., Dr. W. D. Newcomb [illegible] Pathology in General Practice. 11 A.M., Mr. A[illegible] Bourne: Labour, the Supreme Difficulty. No[illegible] Dr. L. J. Witts: The Diagnosis and Treatment [illegible] Anæmia. 2.15 P.M., Dr. T. C. Hunt: Dietetic Dilemma[illegible] in General Practice. 3.15 P.M., Mr. R. M. Handfield-Jones: Hæmaturia, its Significance and Localisation.

SATURDAY.—10.15 A.M., Mr. Duncan Fitzwilliams: Affec[illegible]tions of the Gall-bladder. 11 A.M., Dr. A. E. Clark-Kennedy: [illegible] Noon, Sir William Will[illegible] Common [illegible] and their Treatment. 2.15 P.M., [illegible]: Recent Advances [illegible] Diagnosis and Treatment of Acute Abdominal Dis[illegible] 3.15 P.M., Mr. T. G. Stevens: The Radical Cure [illegible] Prolapse.

SUNDAY.—10.15 A.M., Mr. Leslie Williams: Ma[illegible] Injuries of Childbirth. 11 A.M., Mr. A. Dickson Wr[illegible] Thoracic Surgery. Noon, Dr. H. Courtney G[illegible] Recent Advances in Radiology. (This Course is o[illegible] *to all medical practitioners without fee.)*

MIDDLESEX HOSPITAL POST-GRADUATE COURSE.

FRIDAY, Sept. 28th.—10.15 A.M., Dr. H. L. Marriott: *Treatment of Acute Poisoning.* 11.15 A.M., Mr. F. Roques: Protracted Labour. 12.15 P.M., Dr. A. Moncrieff: Some Disorders in the New-born. 2 P.M., Dr. G. E. Beaumont: Demonstrations in Out-patients. 3.45 P.M., Dr. L. E. H. Whitby: Modern Treatment of Staphylococcal and Pneumococcal Infections.

SATURDAY.—10.15 A.M., Mr. B. R. M. Johnson: The [illegible] of Evipan and Nitrous Oxygen for Dental Extraction. 11.15 A.M., Dr. R. A. Young: New Drugs and O[illegible] Remedies. 12.15 P.M., Mr. A. E. Webb-Johnson: Tuberculosis of the Male Genital Tract. 2 P.M., Mr. Pearce Gould: The Diagnosis and Rôle of S[illegible] Tuberculous Adenitis. 3 P.M., Mr. P. B. [illegible] Present Treatment for Varicose Veins.

SUNDAY.—10.15 A.M., Dr. D. Evan Bedford and Mr. Vaughan Hudson: Thyrotoxic Heart Disease and Treatment. 11.30 A.M., Mr. C. P. Wilson: Common Nasal Conditions and their Treatment. [illegible] Course is only open to former students of the [illegible]

ST. GEORGE'S HOSPITAL POST-GRADUATE COU[illegible]

FRIDAY, Sept. 28th.—Noon, Dr. John Taylor: D[illegible]tion of Pathological Specimens. 1.15 P.M., Mr. [illegible] Surgical Demonstration. Dr. Feiling: Medical [illegible]stration. 2.15 P.M., Dr. Gordon: Dem[illegible] Skin Diseases. 3.15 P.M., Dr. Bell[illegible] *Diseases of Children.* 4.30 P.M., Mr. Jo[illegible]: D[illegible] of the Ear. 5.30 P.M., Mr. Hines: Demonstration [illegible] Cases of Chronic Gonorrhœa in the V.D. [illegible] 8.30 P.M. (meeting of the Hunterian Society). [illegible] Edmund Spriggs: Migraine.

SATURDAY.—9.30 A.M., Dr. Curran: Psychiatric Emer[illegible]gencies. 10.30 A.M., Mr. Doggart: Diseases of the Ey[illegible] Mr. Nicholls: Injection of Varicose Veins or Pi[illegible] 11.30 A.M., Dr. John Taylor: Lecture. 12.15 P.M. Dr. Edwards: New Agents for Anæsthesia. 1.45 P.M. Mr. Back: Operations. 3 P.M., Dr. Cordiner: Recent Advances in the Radiological Investigation of the Gastro-intestinal Tract. 4 P.M., Dr. Benjafield [illegible] Bacteriotherapeusis in General Practice.

SUNDAY.—10 A.M., Mr. Harold Taylor: Determination [illegible] Sex. 11 A.M., Mr. Frankau: The Surgery of the Sympathetic System. Noon, Dr. Gainsborough [illegible] Peptic Ulcer and its Treatment. (This Course is only open to former students of the Hospital.)

KING'S COLLEGE POST-GRADUATE COURSE.

SATURDAY Sept. 29th.—Noon, Mr. Fairbank: [illegible] Cases. Dr. East: Cardiological Cases. Mr. Saunders [illegible] Radium Cases. 2.30 P.M., Dr. Cogswell: [illegible] P.M., Dr. McCance: D[illegible] Dr. Thomson: D[illegible] 4 P.M., Mr. Gilli[illegible] tions for Forceps. 5 P.M., Sir Charlton [illegible] Buxton and Mr. Bell Milne will open a [illegible] the Importance of Dental Sepsis in General Me[illegible] and Surgery.

SUNDAY.—10.30 A.M., Dr. Lawrence: Insulin and Treatment of Diabetes. 11.15 A.M., Dr. Firth: [illegible] Disease in Old Age. Noon, Mr. W[illegible] [illegible] al Diagnosis. (This [illegible]

CHARING CROSS HOSPITAL POST-GRADUATE COUR[illegible]

SATURDAY, Sept. 29th.—10 A.M., Mr. L. G. Brown: [illegible] Suppuration of the Nasal Accessory Sinuses. 11 [illegible] Dr. K. Shirley Smith: The Heart in Toxic G[illegible] Noon, Mr. E. A. Crook: Anal Fistula. 12.30 P.[illegible] Dr. Russell J. Reyno[illegible] Dr. C. K. J. Hamilto[illegible] Differential Diagnosis [illegible] E. C. Warner: The [illegible] 4 P.M., Mr. M. L. Hin[illegible] Diseases.

SUNDAY.—10 A.M., Mr. H. E. Batten: Manipu[illegible] 11 A.M., Mr. C. Jennings Marshall: Chronic [illegible] Noon, Mr. Norman Lake: Diagnosis and M[illegible] of Appendicitis. 2 P.M., Mr. J. Bright Banister [illegible] Diagnosis of Pelvic Swellings. 3 P.M., Dr. W. [illegible]